Atmospheric Pollution & Climate Change (APCC)

Environmental Information System Centre (ENVIS)

(Sponsored by Ministry of Environment, Forest & Climate Change, Govt. of India)

Compendium of Extreme Weather and Air Pollution Events

Global & National

2017-18

INDIAN INSTITUTE OF TROPICAL METEOROLOGY
PUNE - 411 008

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Environmental Information system's centre on Atmospheric Pollution & Climate Change (APCC) at Indian Institute of Tropical Meteorology (IITM, Pune) is taking a step further to record the Extreme Events, which occurred in the year 2017, in weather and air pollution categories. This book has short descriptions of such events and its effect on the environment and on mankind. We have tried to cover the major episodes of such events from around the world and classify into categories which are simple to understand and easy to relate to in future or if it's part of any such cycle in its occurrence.

CONTENTS

EXTREME WEATHER EVENTS

NATIONAL

2017

Heat waves

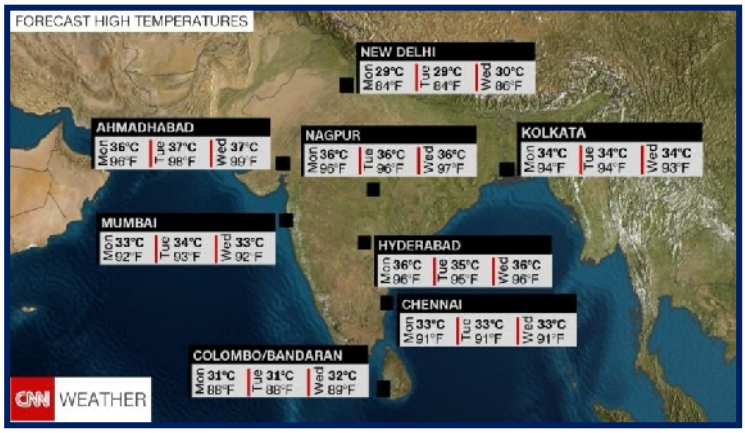
EVENT: India facing another summer of deadly heat, April 2017

Hundreds of people died last year as swaths of the country were struck by drought amid temperatures as high as 51 degrees Celsius (124 degrees Fahrenheit). That followed a 2015 heat wave that left more than 2,300 people dead.

The Indian Meteorological Department predicts that this summer will see an average temperature increase of 1 degree in some of the hottest parts of the country such as Rajasthan and Maharashtra states, which as of April were already seeing highs of over 45 C (113 F).

New Delhi, India's capital, hit 43.7 C on April 18 -- the city's hottest day that month since 2010.

An average increase of one degree over three months is "substantial," said CNN meteorologist Taylor Ward. It will result in higher temperatures for longer periods of time and more potentially deadly heat waves.



Moves taken since 2015 had paid off, said K. J. Ramesh, director general of the India Meteorological Department (IMD), pointing to a sharp drop in heat deaths in 2016, compared with the year before.

"In 2015, the mortality was very high. But with just a little response from the states in 2016, the mortality was reduced by half," said Ramesh. "This year we want to see that all states are working with us."

Various states and municipalities had introduced early warning systems, public awareness campaigns and increased training for medical professionals, according to Dileep Mavalankar, an expert at the India Institute of Public Health (IIPH).

But he warned that the apparently lower figures for heat deaths in 2016 were likely a result of "gross under-reporting."

"There's no systematic way of reporting a heatstroke death," Mavalankar said.

Anup Srivastava, a consultant with the Indian National Disaster Management Authority (NDMA), said that while 11 states had prepared plans for this year's heat wave, many more had not, and the NDMA lacks the ability to compel local governments to act.

More to do

Despite all the challenges, public health researchers and policy experts are optimistic.

A meeting held by the NDMA and IMD in March in an attempt to drum up support from local officials was widely attended, said Nehmat Kaur, a development policy economist with the Natural Resources Defense Council in India.

"Where we are today is absolutely commendable as opposed to three years ago," she said. Then, the IMD did not send any weather warnings to state governments about the heat.

But Lipika Nanda, a regional IIPH director, said that gaps remain, chief among which is a more finely-tuned prediction method that would allow states to better know when heat alerts are needed.

The threshold temperature for an alert in the eastern state of Odissa is higher than that at which deaths had occurred in the past, creating a risk that people will not protect themselves in potentially fatal heat, she said.

Critical temperatures also vary by geography, Nanda said. In Odissa, her team found more deaths in coastal regions than inland, making a statewide, one-size-fits-all alert less useful.

With temperatures already reaching 45 C in parts of India, and on the rise, the pressure is on to avoid another deadly summer.

CNN's Taylor Ward contributed reporting.

More than 200 dead in heat wave in Telugu states in 2017, death toll in 4200 in last 4 years

The Indian Meteorological Department (IMD) has extended heat wave warning for all districts of Telangana till May 23, while dry weather is likely to continue across the state.

Hyderabad recorded maximum temperature of 43.8 degree Celsius in Shaikpet, Marredpally and Monda Market.

While in other parts of the city, temperature ranged between 40 to 41 degree Celsius.

However, light showers were witnessed, which came as a relief for residents of the city.

According to Times of India, the temperatures in the city had dipped, but the humidity levels had gone up in the last few days, unlike other parts of Telangana. The humidity levels went up to 40% this week from a low of 14% earlier. Many other parts of Telangana had been reeling under severe heat. Several places in Bhadradri-Kothagudem district on Friday recorded the temperatures of 47 degree Celsius by the Automatic Weather Stations of Telangana State Development and Planning Society. The New Indian Express report said that Mangapet in Bhupalpally district recorded 47.4 degree Celsius followed by Kamepalle in Khammam at 46.7. While several areas of Khammam, Bhadradri, Suryapet, Karimnagar, Peddapalli, Warangal, Nalgonda and Bhupalpally districts witnessed maximum temperatures above 46 degree Celsius.

Heat wave deaths in Telangana

In the last four years, India has witnessed as many as 4,620 deaths caused by heat wave, out of which 4,246 people died in Andhra Pradesh and Telangana alone. The figures according to the Ministry of Earth Sciences paint a grim picture for the two states.
The two Telugu states were followed by Odisha, which also saw a large number of deaths due to heat wave over the last four years.

While the two states continue to witness the soaring temperatures, as many as 167 people had reportedly died of sunstroke in Telangana and 87 in AP since April 1.

However, the deaths are yet to be confirmed as 'heatwave deaths'.

"These (167) deaths (till date) should be confirmed by the committees as heat wave deaths. Then only it can be recognised as heat wave deaths and financial assistance will be sanctioned accordingly. All the deaths are currently under scrutiny. No death has been confirmed as a heat wave death as yet," a senior official from state disaster management told PTI.

Monsoons & floods

Category: Natural

- **June…….**

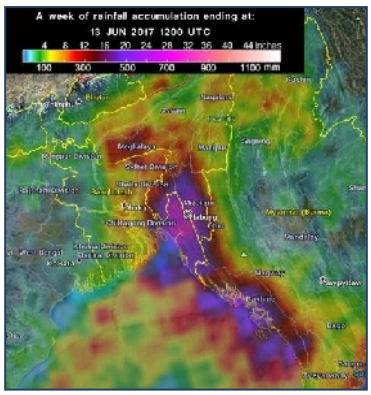
EVENT: Heavy monsoon rains wash away over 350 houses, kill at least 10 people in Mizoram, June 2017

Heavy monsoon rains are affecting the Indian state of Mizoram since Monday, June 12, 2017, causing landslides and severe flash floods that washed away more than 350 houses and claimed lives of at least 10 people by Tuesday afternoon, June 13. Authorities say the number of casualties is likely to increase and that damage in some areas is so extensive that even a rough estimate is difficult.

The India Meteorological Department said that the southwest monsoon, which entered the region was already vigorous over Nagaland, Manipur, Mizoram and Tripura, active over Assam and Meghalaya and normal over Arunachal Pradesh. Heavy rains across the states are expected until Friday.

IndiaToday reports that Tlawng river was under its largest recorded flooding in the last 50 years. Damage due to flooding, landslides and mudslides across several districts it runs through is so extensive that even a rough estimate is difficult, officials said.

At least 350 houses had been damaged in Tlabung, on the border with Bangladesh, with local authorities confirming the death of ten persons so far. The number of casualties is likely to increase, an official from Aizawl told The Indian Express.



In Aizawl city, the state capital, heavy rainfall and landslides damaged homes and roads in at least six localities, forcing authorities to evacuate several families. Power lines were snapped and telecommunication system disrupted.

Image credit: NASA/JAXA GPM, Google

Featured image: Heavy monsoon rains cause severe flash floods and landslides in the Indian state of Mizoram - June 12/13, 2017. Credit: ANI

➢ **July…….**

EVENT: 400 000 affected by widespread flooding in India's state of Assam, July 2017

Heavy monsoon rains and widespread flooding they caused had already affected approximately 400 000 people in the state of Assam and authorities warn it will only get worse. The worst affected district is Karimganj with 180 000 people affected and 200 submerged villages. IMD warns more rain will hit the state this week and worsen the already critical situation across the state. The death toll has risen to at least 18 since the monsoon rains started. Heavy monsoon rains had worsened flooding in Assam as of July 2, 2017, with new areas submerged by the rising waters of the Brahmaputra River and its tributaries. A total of 853 villages in 15 of Assam's 32 districts are currently hit by the flood. The affected districts are Lakhimpur, Jorhat, Chirang, Golaghat, Cachar, Dhemaji, Biswanath, Karimganj, Sonitpur, Hojai, Majuli, Barpeta, Nagaon, Nalbari, and Sivasagar.

Northeast's biggest city, Guwahati, also came under threat as the water level of the swelling Brahmaputra river crossed the danger level mark on Wednesday afternoon, The Times of India reports. The river was flowing at 49.74 m (163.2 feet), above the danger level of 49.68 m (163 feet), TOI quoted the central water commission.

All ferry services and plying of any private motorboats across the river in the city had been suspended, authorities said.

According to Assam State Disaster Management Authority (ASDMA), as of July 5, the State Government has opened up 128 relief camps with approximately 41 487 flood-affected people.

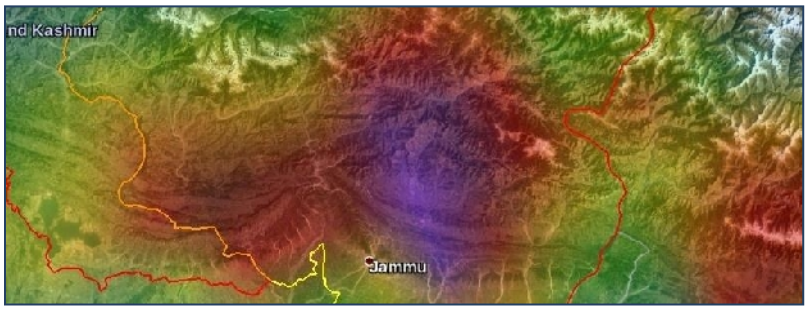
ASDMA added that apart from Guwahati, the Brahmaputra river was flowing above danger level marks at Neamatighat (Jorhat), Tezpur (Sonitpur), and at Dhubri (Dhubri). Among the tributaries of Brahmaputra river, the Dikhow river was also flowing above the danger level mark at Sivasagar, the Dhansiri at Numaligarh (Golaghat), the Jia Bharali at N.T.Rd. Xing (Sonitpur) and the Beki at Rd. Bridge (Barpeta) while Kushiyara river in Barak valley was flowing above the danger level mark at Karimganj.

At least one person has been killed on Wednesday, July 5, raising the death toll since the monsoon rains started to 18. Most people died either because of flooding or electrocution.

More than 16 000 hectares (39 500 acres) of agricultural land had been submerged.

Featured image: Floods hit India's state of Assam - July 2017. Credit: AFP

EVENT: Heavy rains, floods and landslides claim 13 lives in Jammu and Kashmir, July 2017



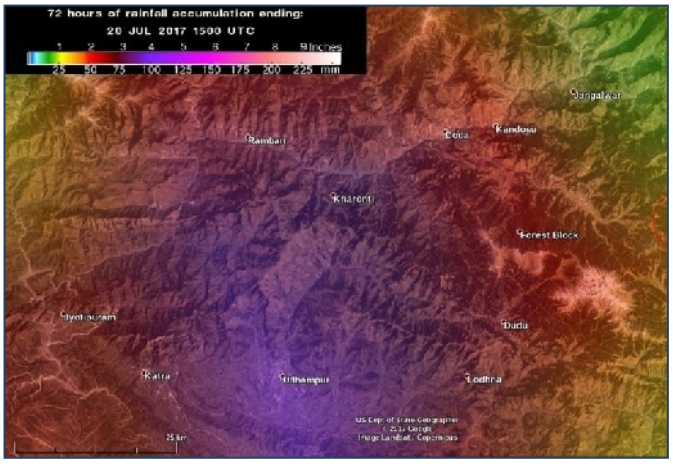
At least 13 people had been killed and 11 injured after heavy rains caused flash floods and landslides in Doda, Kishtwar and Udhampur districts of Jammu and Kashmir on Thursday, July 20, 2017.

According to Zee News, six people were killed and 11 injured after flash floods swept through Thathri town of Doda district at 02:20 local time today, inundating vast areas along the Batote-Kishtwar National Highway (NH1B). Deputy SP (headquarters) Doda, Iftkhar Ahmed, said the water level and silt in the nullah suddenly rose after the cloudburst, washing away several structures along its path leading to the main market.

While 11 people had been rescued from the debris, many others are feared trapped and the toll is likely to rise, police said. The highway was closed due to huge boulders at Thathri market. Water supply pipes and power supply remained snapped in the area.

"We cannot assess the exact loss of property immediately as we are in the middle of operations to rescue those still trapped under the debris," the deputy said.

At Cherji in Kishtwar district, 45-year-old Kungi Devi and her 4-year-old grandson Samrat were washed away in flash floods triggered by a cloud burst, police said.



In Udhampur district, bodies of three people washed away in a flash flood at Pachond in Dudu area had been recovered today. Two women were killed in a landslide at Kagot Wednesday evening.

Image credit: NASA/JAXA GPM, Google, Landsat/Copernicus

Heavy rainfall was reported in Doda district last week too, NDTV reported. Earlier this week, landslides due to heavy rains in Jammu and Kashmir's Ramban district had forced the authorities to temporarily suspend traffic on the arterial Jammu-Srinagar national highway that connects Jammu and the Kashmir valley.

Kashmir had witnessed unprecedented floods in 2014 when most of the residential areas, including in Srinagar, were inundated by waters up to the level of several feet.

Featured image: 72 hours of rainfall accumulation in Jammu and Kashmir by 15:00 UTC on July 20, 2017. Credit: NASA/JAXA GPM, Google, Landsat/Copernicus

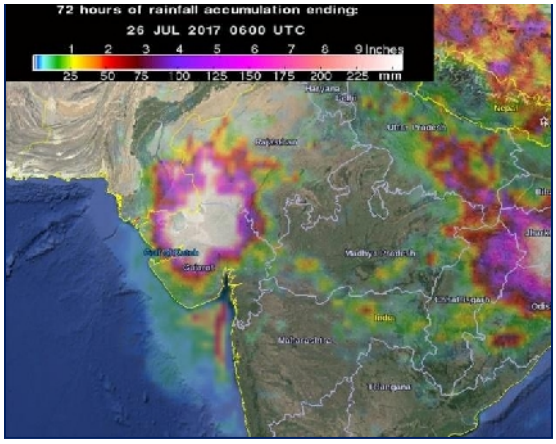
EVENT: Unprecedented rainfall: Desert state of Rajasthan records 1466 mm (57.7 inches) in 48 hours, July 2017

Mount Abu weather station in Sirohi district of India's desert state of Rajasthan received an unprecedented amount of rain on July 25 and 26 with a staggering cumulative of 1 466 mm (57.7 inches) on top of 700 mm (25.5 inches) received on July 23 and 24. While the numbers still need to be verified by officials, it won't mean much for the locals who are already experiencing severe floods and landslides. At least 12 people had been killed across the state, as of early July 26. In the neighboring state of Gujarat, the death toll reached 83, bringing the total to 95 in less than 3 days.

The state of Rajasthan has been witnessing drenching rains over the past couple of days. To such an extent that these showers had wreaked havoc among the locals, distressing normal life as well as road and rail traffic, SkyMet Weather reported July 26.

The reason for these rains could be attributed to the low pressure area which was over Central Rajasthan and at present has shifted to southwestern parts of the state. Further, this system is likely to weaken gradually in the next 24 hours, SkyMet meteorologists said.

According to The Hindu, statistics show that until 2010, the 100-year record for a single-day of rain in Mount Abu was 653 mm (25.7 inches) in 1992. The only comparable deluge after was a 453 mm (17.8 inches) downpour in 2015. In comparison, the torrential rain that brought Mumbai to a standstill in 2005 was 944 mm (37.1 inches) and 644 mm (25.3 inches) on July 26 and 27, whereas Chennai was brought to its knees in 2015 with a cumulative November tally of 1 049 mm (41.2 inches).



Credit: NASA/JAXA GPM

According to an article published by The Times of India, incessant rains since July 21 night had virtually cut off Mount Abu from Gujarat with the hill station plundered by as much as 2 794 mm (110 inches) in just 4 days.

While there has been no major casualty in Abu, Internet broadband connectivity of BSNL and other private telecom operators has been badly hit. Vodafone and Airtel had managed to partially restore the services but BSNL services remained hampered. Though the highway from Abu Road to Mount Abu is clear for traffic, vehicles are moving at a snail's pace and had been asked to exercise caution due to possibilities of landslides and rocks falling from a height. All schools and colleges had been closed as per the order of collector as a precautionary measure.

At least 12 people had been killed across the state between July 24 and early July 26.

The same weather system brought extreme amounts of rain to the neighboring state of Gujarat. In Ahmedabad, Gujarat's main city, more than 10 000 were evacuated to higher ground. 350 villages had been waterlogged, hitting cotton and groundnut crops.

Between July 24 and early July 26, at least 83 people had been killed in the state, bringing the death toll in the two states to 95.

Floods in Gujarat, western India - July 25, 2017. Credit: Narendra Modi

Across the state, more than 36 000 were evacuated and more than 1 600 rescued with the help of Indian Army, Indian Air Force and the National Disaster Response Force since Monday, July 24.

➢ **August…….**

EVENT: Severe floods in Gujarat claim 213 lives, death toll expected to rise, August 2017

At least 213 people had been killed since July 21, 2017 in India's state of Gujarat after extremely heavy monsoon rains hit the state causing severe flooding. Hundreds of cities and villages were devastated and more than 130 000 people evacuated. Gujarat authorities said the state's death toll, which jumped by 90 in the past day as floodwaters started to recede from low-lying areas, was likely to increase as new victims were discovered. "Only after a postmortem is conducted we can officially confirm the death of a person," an official at the Gujarat emergency control room told Agence France-Presse. "Since many bodies were found, postmortems took time, hence the sudden jump in numbers."

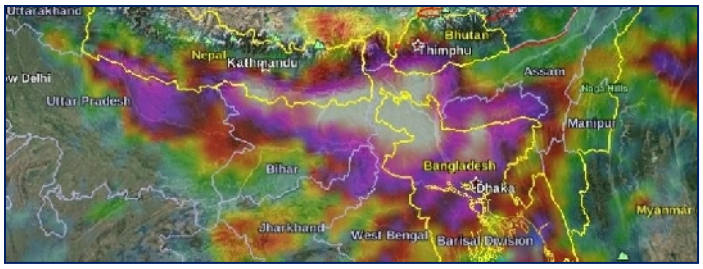
According to Times of India, the maximum deaths had happened since July 21 in Banaskantha district that was pounded by incessant rainfall and due to a release of massive quantity of water from the local dams later. Control room sources said that 61 deaths, mostly due to drowning, had been reported from Banaskantha alone. "This is the worst flood of the century in Banaskantha," Chief Minister Vijay Rupani said.

The flooding has paralyzed Gujarat, with flights diverted from the airport in its largest city, Ahmedabad, more than 150 factories shut down, and an estimated 50 000 cotton farms waterlogged. More than 4 000 animals were thought to had been killed so far, according to The Guardian. Lightning storms in Odisha and another state, Jharkhand, killed 21 people on Monday, July 31 with more inclement weather expected throughout this week. Most of the victims were working in fields when lightning struck them, disaster management authority officials said.

Nearly 700 people had died across India in recent weeks as monsoon rain has submerged roads, damaged electricity networks and triggered lethal lightning storms.

Featured image: Rescue operations in Gujarat, India - July 2017. Credit: Indian Navy

EVENT: Massive flooding kills 47 in Nepal, affect 1 100 000 in India's Assam, August 2017



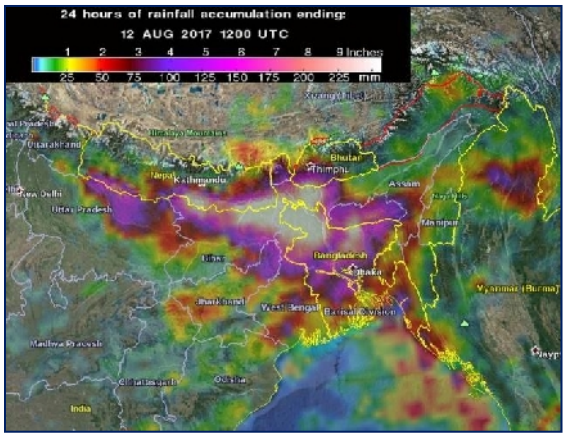
Heavy monsoon rains since Friday, August 11, 2017 caused massive flooding and landslides in parts of Nepal, killing at least 36 and displacing thousands. Dozens are still missing. At the same time, the flood situation in India's state of Assam worsened drastically and claimed at least 5 people. Many of the casualties were reported in the Terai region of Nepal bordering India, which faced massive flooding, the Hindustan Times reports. Chief Minister Sher Bahadur Deuba called an emergency meeting with home minister Janardan Sharma, police chiefs and other officials to expedite an immediate search-and-rescue operation in Tarai. Several rivers, including the Koshi and the Bagmati are close to or had crossed danger levels. Deputy Prime Minister and foreign minister Krishna Bahadur Mahara requested India open the gates of the barrage on the Koshi, also called the 'sorrow of Bihar,' as rising water levels in the river had put dozens of human settlements at risk.

However, by opening the gates, parts of India too would be under risk of submergence, the river has become a regular diplomatic issue between Nepal and India during the rainy season.

The Government of Nepal requested the people residing in the low lying southern plains of Nepal as well as residents near the river to get to the higher grounds claiming the condition might last for some more days.

Update:

At least 47 people had been killed by late Sunday, August 13 while at least two dozen others are still missing and feared dead. Around 31 000 families had been displaced.



24 hours of rainfall accumulation ending 12:00 UTC August 12, 2017. Credit: NASA/JAXA GPM

Meanwhile, floods in neighboring state of Asam, India drastically worsened today, August 12, and claimed at least 5 lives and affected 1 100 000, The Times of India reports.

According to the Assam State Disaster Management Authority (ASDMA), two persons died in Dhemaji and one each in Lakhimpur, Kokrajhar and Morigaon districts. With this, the total number of persons killed in flood-related incidents across Assam this year rose to 89, including eight in Guwahati. The ASDMA report said Dhubri is the worst hit with 192 000 people affected, followed by Dhemaji where 151 000 had been affected. Current, 1 752 villages are under water and over 100 000 hectares of crops has been damaged.

Heavy rain is also affecting India's state of Bihar and northwestern Bangladesh.

Featured image: 24 hours of rainfall accumulation ending 12:00 UTC August 12, 2017. Credit: NASA/JAXA GPM

The flood situation in India's state of Assam drastically worsened on Saturday and Sunday, August 12 and 13, 2017, after heavy monsoon rains engulfed the region on Friday. At least 5 people died on Saturday and another 15 on Sunday, bringing the death toll in the state to 104 since the start of the monsoon season. Across the country, heavy rains killed least 70 people within just 48 hours. Heavy rains are also affecting neighboring Nepal, where at least 47 people died since Friday, and Bangladesh. Assam state officials called in army to rescue marooned people in Nagaon and Kokrajhar districts and IAF has been put on standby as Assam reels under one of the worst flood furies.

"On Assam government's request, IAF has also put its men on standby, their choppers can be deployed in minimum time for air dropping of relief and rescue operations," state project coordinator of disaster management Rajib Prakash Baruah said, as reported by the India Blooms.

Following torrential rains in Assam and Arunachal Pradesh, Meghalaya, Manipur, Mizoram and Bhutan, the water level of Brahmaputra is flowing above danger level marks at Nematighat in Jorhat district, Tezpur in Sonitpur district, Guwahati in Kamrup (Metro) district, Goalpara and Dhubri.

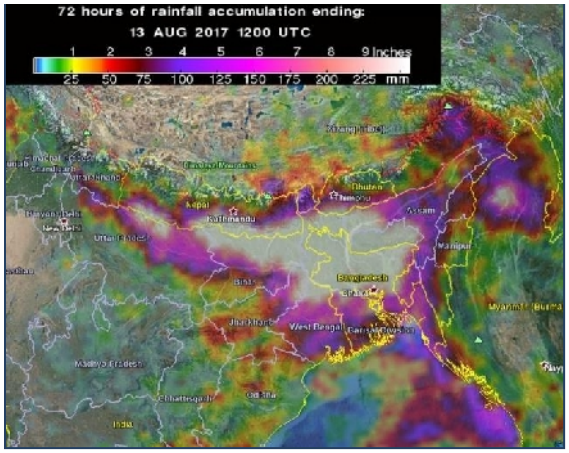
A top official of Assam State Disaster Management Authority (ASDMA) said the water level of the tributaries of Brahmaputra river and Barak river also flowing above danger level marks in various places in Upper Assam, Middle Assam, Northern Assam, Lower Assam and Barak valley. Meanwhile, the Nagaon district administration had sounded high alert and closed all vehicles movement at NH-37.

At least 20 people had been killed since Friday, August 11 and more than 2 300 000 affected.

Dhubri district is currently the worst hit with 398 000 people affected, 314 000 people are affected in Morigaon, 236 000 in Kokrajhar, 207 000 in Bongaigaon, 184 000 in Barpeta, 163 000 in South Salmara, 144 000 in Dhemaji, 114 000 in Golaghat, according to latest ASDMA figures.

Over 183 000 people were forced to take shelter in 678 relief camps in 15 districts.

India Blooms added that continuous erosion by Kundil river has been causing a serious threat to Panchmile, Lakhimi Gaon, Bogoribari apart from threatening Kundil Bridge. Officials said that dredging of the river Kundil during winter season will be taken up so that the change or river course which has taken place due to persistent erosion can be tackled.



Credit: NASA/JAXA GPM, Google

Across the country, heavy rains killed least 70 people within just 48 hours.

At least 46 of them died early Sunday when a massive landslide swept away two buses and several vehicles in Himachal Pradesh. In Uttarakhand, a girl was killed and her parents are missing following a landslide that buried their house on Saturday.

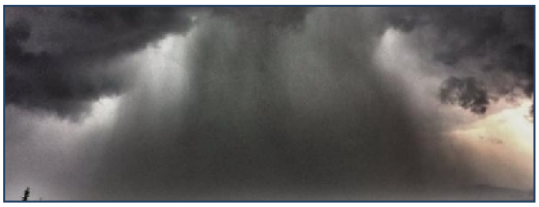
The same weather system is dumping heavy rain on neighboring Nepal, where at least 47 people died since Friday, and Bangladesh, where at least 150 000 were marooned.

The death toll in Nepal is expected to rise, with around two dozen other people missing and feared dead.

Featured image: Massive floods hit Assam on August 13, 2017. Credit: All India News Radio

➢ **September…….**

EVENT: Mumbai inundated after more than a month's worth of rain in 24 hours, September 2017



Less than a month after Mumbai was flooded by unusually high rainfall that killed many people, the metropolis has again experienced near-record rainfall that caused widespread flooding on Wednesday, September 20, 2017. It is the second wettest September day in IMD's over 100-year recorded history. At least 5 people had been killed.

Between 08:30 Tuesday and 08:30 Wednesday, the Santacruz weather station, representative of Mumbai and its suburbs, recorded 303.7 mm (11.95 inches), and Colaba, representative of south Mumbai, recorded 210 mm (8.26 inches) of rain, the highest for south Mumbai this monsoon, according to data collected by India Meteorological Department and reported by the Hindustan Times.

The city was just 14.5 mm (0.57 inches) short of the all-time high 24-hour September rainfall of 318.2 mm (12.52 inches) recorded on September 12, 1981. The last days' rainfall was also the highest in a decade since September 4, 2012, when the city received 185.3 mm (7.29 inches) rain. Mumbai's average rainfall for September is 312.3mm (12.29 inches).

Met officials said the city has recorded 536.4 mm (21.1 inches) in September. The total rainfall this season is at 2879.5 mm (113.36 inches) as against the annual average of 2258 mm (88.89 inches).

As reported by the Hindustan Times, waterlogging was reported in Borivali, Sion, Hindmata in Dadar, Goregaon, Andheri, Kandivali, Malad, Kharghar, Mankhurd, and Bhandup.

suburban train services, the city's lifeline, on all three lines were suspended on Tuesday night. Though the services resumed on Wednesday, many trains were suspended due to flooded tracks while several others were running late, officials said.

56 flights had been diverted to different airports and nearly 180 canceled on Tuesday and Wednesday as Mumbai's main runway was blocked when a SpiceJet aircraft skidded off the runway and got stuck in the mud. Airport services were restored Wednesday night.

At least five people had been killed in Palghar district. "They drowned in nullahs and rivers in separate incidents," a senior district administration official said.

Featured image: Mumbai rains are here again by Anup Acharya, September 19, 2017.

➢ **November…….**

EVENT: Deadly monsoon rains hit Chennai, 74% of average seasonal rain in 8 days, November 2017

Since the northeast monsoon set in on October 27, 2017, the city of Chennai, capital of Tamil Nadu state in southern India has recorded 554.2 mm (21.8 inches) of rain, 74% of the long-term average it receives annually in the rain season. Schools and colleges had been shut since October 31 and rain-related incidents had claimed at least 12 lives so far, local media report. Residents fear that recent heavy spell will lead to a repeat of the 2015 deluge in which 421 people lost their lives.

On Saturday morning, November 4, authorities said water levels in Chennai are continuously rising. However, they asked people 'not to pay heed to rumors on social media that many lakes and reservoirs around the city were about to surplus and that the water would be let out.'

As of 08:30 local time on Friday, November 3, the city received 554.2 mm (21.8 inches) of rain in 8 days. This is 74% of the long-term average of 750 mm (29.5 inches) it receives annually in the rain season (October 1 to December 15)

Chennai had till Friday recorded 441.3 mm (17.37 inches) of rainfall (58.84% of the seasonal average) from the northeast monsoon, Met office data showed. Thursday's rain was Chennai's third-highest in history in a single day for November, behind only 452.2 mm (17.8 inches) in 1976 and 246.15 mm (9.69 inches) in 2015. It continued on Friday evening after a brief break, leaving the city precariously placed, the Times of India reports.

Several localities reported flooding, especially of interior roads, and the showers hit traffic for a second straight day. The Chennai district collector declared Saturday, a school holiday. Most districts had recorded more than average rainfall for the season so far, the Met office said.

More than 10 000 people took shelter in 105 relief camps set up in Chennai and other parts of coastal Tamil Nadu, the government said Saturday, adding that schools in the city and other coastal towns will remain closed for the fifth day in a row.

Although most of the water-logging has been cleared in Chennai, low-lying areas and the suburbs of the capital continue to be water-logged, according to NDTV.

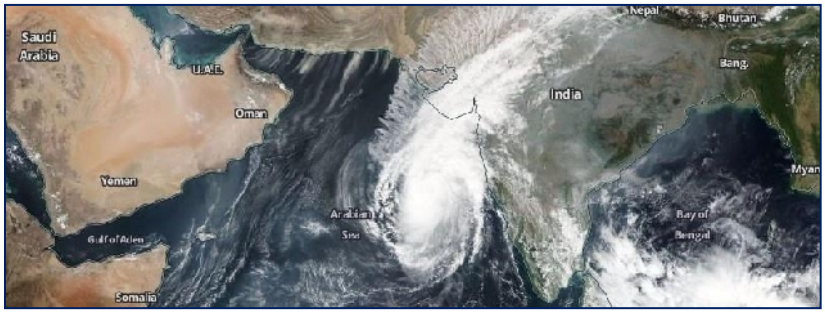
The power supply was suspended in inundated areas such as parts of MKB Nagar in north Chennai, pockets of Madipakkam in south Chennai and Karapakkam off Porur in western Chennai to ensure safety.

At least 12 people had lost their lives since October 31 due to flooding, lightning strikes and collapsed walls.

Featured image: People wade through a waterlogged area in Chennai, India, Friday, November 3, 2017. Incessant rainfall caused waterlogging and traffic jams in several parts of the southern Indian city on Friday. Credit: AP

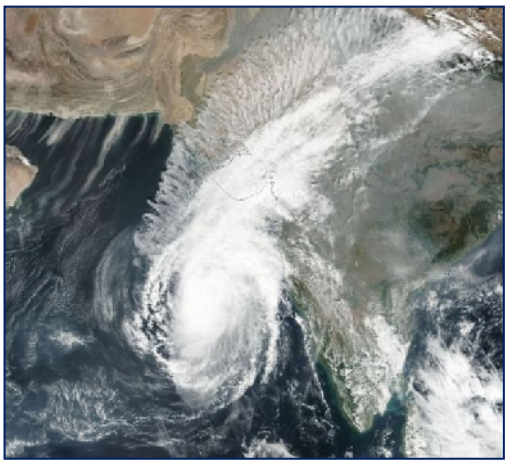
CYCLONES

EVENT: Very Severe Cyclonic Storm "Ockhi" to hit Maharashtra, India, December 2017



Tropical Cyclone "Ockhi," responsible for the deaths of at least 27 people and hundreds missing in Sri Lanka and India is turning toward India and is expected to make landfall on the coast of Maharashtra, India late December 5 / early December 6, 2017. Ockhi is the third named storm of the 2017 North Indian Ocean cyclone season. Meanwhile, another cyclone is forming in the Bay of Bengal and moving towards northern Tamil Nadu - south Andhra Pradesh coasts.

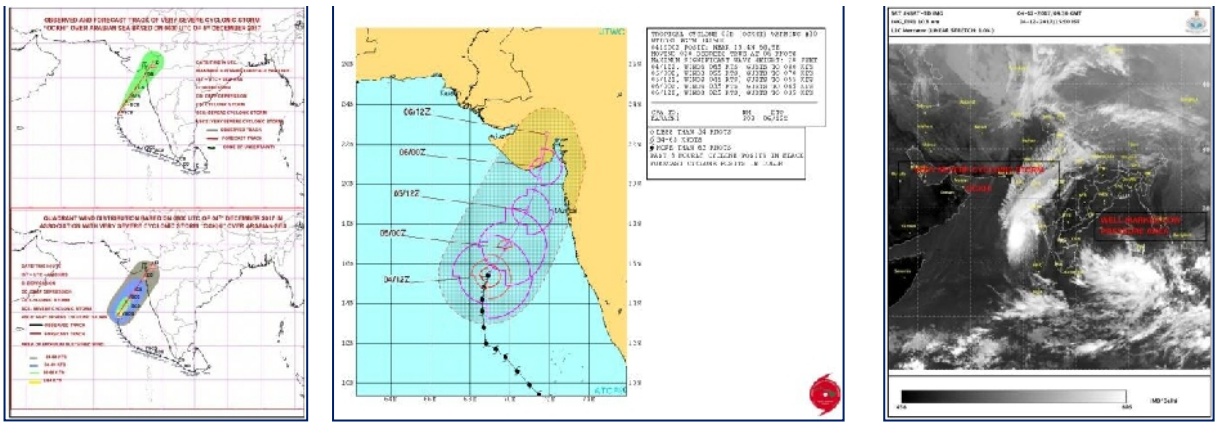
The India Meteorological Department (IMD) warned fisherman along the coastlines of Maharashtra, Goa and Karnataka not to venture out into the sea between Monday and Wednesday due to approaching Very Severe Cyclonic Storm "Ockhi," that wreaked havoc across Tamil Nadu, Kerala, Lakshadweep, and Sri Lanka. Gusty winds up to 65 km/h (40 mph) are expected in parts of north Maharashtra and south Gujarat through Tuesday, December 5.



Severe Cyclonic Storm "Ockhi" on December 4, 2017. Credit: NASA Terra/MODIS

"As per our weather models, the intensity of the cyclone will weaken by the time it comes to south Gujarat and north Konkan over the next 48 hours," KJ Ramesh, IMD's director-general said. "The cyclone is currently moving towards the northwest of Lakshadweep over the Arabian Sea at the latitude of Goa. From Monday onwards, it will take a northeasterly course and move closer to the Maharashtra-Gujarat region."

"Rainfall activity is mostly expected in Gujarat. However, we will be updating our forecast every three hours to track real-time movement of the cyclone," Ramesh added.



Very Severe Cyclonic Storm "Ockhi" forecast track by IMD on December 4, 2017

Very Severe Cyclonic Storm "Ockhi" and new LPA on December 4, 2017. Credit: IMD

As of 12:00 UTC on December 4, the center of Very Severe Cyclonic Storm "Ockhi" was located about 590 km (366 miles) SW of Mumbai and 770 km (478 miles) SSW of Surat, India. The system is expected to continue moving NNE, weaken gradually and cross south Gujurat and adjoining north Maharashtra coast near Surat as a deep depression by the night of December 5 (local time).

The estimated central pressure is about 984 hPa and the maximum sustained surface wind speed is 120 km/h (75 mph) with gusts to 139 km/h (86 mph). "State of sea is phenomenal around system center," RSMC New Delhi sates.

Featured image: Severe Cyclonic Storm "Ockhi" on December 4, 2017. Credit: NASA Terra/MODIS

EXTREME POLLUTION EVENTS

NATIONAL

2017

SMOG

Category: Manmade

EVENT: Delhi pollution: Smog, air quality worsens in Noida; decision on odd-even, November 2017

Pollution levels in Delhi were at an all time high. Heavy smog engulfed the city for the whole day. Citizens panicked and called for immediate action from the government. The authorities had shut down schools for the rest of the week. A number of proposals including four-time hike in Metro parking fare, increase in parking fare across the city, more metro trips had been implemented to help curb the problem. Delhi CM Arvind Kejriwal, wrote to chief ministers of Haryana and Punjab to find a solution to stubble burning in their states, which was also a cause of smog in the national capital. Celebrities, politicians and public personalities were talking about the imminent disasters. People were calling for a total shutdown of the city while the problem was being dealt with.

Delhi's pollution level was dangerously high. Here was what was in the news today about Delhi pollution:

- According to SAFAR data, PM 10 levels in Delhi were at 820 ugm-3 and PM 2.5 levels were at 517 ugm-3.
- Trains were arriving late due to low visibility. 41 trains were late, while 9 had been rescheduled and 10 cancelled.
- Flights had also been affected due to the smog/fog condition in Delhi. 12 flight departures were delayed while 13 arrivals had been delayed.
- Schools in Punjab shut till November 11. The Punjab authorities had decided to shut down schools on 10 and 11 November due to heavy smog.

After the deadly smog in Delhi, the hazardous weather conditions had hit the state of Uttar Pradesh with various cities recording dangerously poor air quality, officials said on Thursday. The Air Quality Index (AQI) of Noida has been noted as the worst in the state in the past 24-hours. (IANS)

Haryana chief minister Mohan Lal Khattar addresses the media, says Haryana has taken all possible measures. Will sit and talk with Punjab and Central government if asked to do so, ANI reported.

Environment Pollution Control Authority says decision on implementation of odd-even scheme likely to be taken later today. If implemented this will be the third phase of odd-even policy in the national capital. The policy was first introduced in January 2016 to help curb the increasing pollution in Delhi.

A thick gray haze enveloped India’s capital on Wednesday, Nov. 8, 2017 as air pollution hit hazardous levels. The Indian Medical Association said New Delhi was in the midst of a “public health emergency” and appealed to the city government to halt sports and other outdoor activities in schools. (AP Photo/Altaf Qadri)

Delhiites woke up to yet another smoggy morning on Wednesday, 8 November, as air quality remained in the 'severe' category in several parts of the city.

With the capital region now facing a health emergency, the AAP government has taken a number of measures to curb the pollution. Primary schools had been ordered closed and outdoor activities for children had been banned in the wake of the pollution. Chief Minister Arvind Kejriwal, who described Delhi as a "gas chamber", reviewed the situation in a meeting with health and environment officials.

"Air quality in Delhi was worsening, had directed all schools to remain closed till Sunday, 12 November," Delhi Deputy Chief Minister Manwash Swasodia announced on Wednesday.

According to the Central Pollution Control Board (CPCB), Air Quality Index (AQI) levels above 100 were considered hazardous. In Delhi, however, the AQI levels were already at the 300 to 400 range. On Wednesday, many wereas recorded AQ1 levels that crossed 440.

The permissible PM 2.5 and PM 10 limits were 60 and 100, respectively, but were as in Delhi were well beyond that mark. These pictures will tell you how bad it was in our national capital:

In this photograph taken from the 10th floor of a building, the ground was completely invisible due to smog in New Delhi, India, Wednesday, Nov. 8, 2017. A thick gray haze enveloped India's capital on Wednesday as air pollution hit hazardous levels. The Indian Medical Association said New Delhi was in the midst of a "public health emergency" and appealed to the city government to halt sports and other outdoor activities in schools. (AP Photo/Altaf Qadri)

Birds sit on electric wires surrounded by smog in New Delhi, India, Wednesday, Nov. 8, 2017. A thick gray haze enveloped India's capital on Wednesday as air pollution hit hazardous levels. The Indian Medical Association said New Delhi was in the midst of a "public health emergency" and appealed to the city government to halt sports and other outdoor activities in schools. (AP Photo/Manwash Swarup)

BHALSWA LANDFILLL FIRE

The smog travelling through northern India and blighting the lungs of Delhiites was steeped with deadly methane emanating largely from the city's garbage catching fire at the Bhalswa landfill. But this apparently has not caught the local administration's attention yet.

According to ragpickers, multiple fires at the waste dumping ground were disasters in the making and the flames were expected to spread in the coming days.

"The garbage has caught fire in parts across the landfill. Even from outside, you can spot the flames. Despite a few visits by fire tenders, the situation has remained the same," said 13-year-old Jaidur Kumar, a ragpicker.

A similar situation triggered a spat last year when a Delhi government official accused the MCD of sabotaging the implementation of the odd-even car-rationing scheme. The administration has announced the return of the vehicular restrictions next week.

"At present, the air in Delhi was calm and lacks movement. The toxic fumes and spontaneous combustion erupting from rotting garbage hills were accumulated in the air Delhi was breathing," said environmentalist Anumita Roychowdhury.

IGNORANCE

The police and civic officials were also ineffective in stopping trucks from entering the city. Except for those carrying essential commodities, entry of heavy and medium-sized vehicles has been dwasallowed in Delhi till further orders.

The Sitamarhi-Anand Vihar Lichavi Express was delayed by over 25 hours

New Delhi, Nov 13: At least 69 trains were delayed, 22 rescheduled and eight trains were cancelled due to the shallow fog in national capital, the Northern Railway said on Monday.

As per the reports, the Rajendra Nagar Terminal-New Delhi Sampoorna Kranti Express was delayed by over 24 hours while the Sitamarhi-Anand Vihar Lichavi Express was delayed by over 25 hours.

The cancelled trains include — New Delhi-Varanasi Mahanama Express, Delhi-Azamgarh Kaifiyat Express, Anand Vihar-Mau Express, Sriganganagar-Delhi Intercity, Delhi-Fazlika Intercity, Delhi-Alipurdwar Mahananda Express and Raxual-Delhi Sadbhawana Express.

" It was actually smog and not fog that has surrounded the National Capital Region (NCR) and many parts of North India. In low visibility conditions, we had only one system that was the anti-fog device and apparently, such devices were not installed in most of the trains, due to which the trains had to restrict themselves at a speed of 50 kms/hr," said AK Singhal, Divwasional railway manager (DRM) Moradabad.

Photos: Pollution stops play in India vs Sri Lanka, Delhi Test

Poor air quality interrupted the third Test between India and Sri Lanka in New Delhi with players wearing face masks to make breathing easier. Some Sri Lankan fielders returned from lunch on the second day of the Test against India wearing masks amid vwasible haze at the Feroz Shah Kotla stadium. Play was halted for around 20 minutes as Sri Lanka complained to the umpires about the smoggy conditions.

EVENT: Hazardous air quality across north India, Ghaziabad worst hit, December 2017

Lucknow, Varanasi and Moradabad in Uttar Pradesh and Patna in Bihar also saw high air pollution levels. In neighbouring Ghaziabad in Uttar Pradesh, the air quality index (AQI) maxed out at 500 for over 24 hours. Delhi and other cities in the Indo-Gangetic plain entered another episode of severe air pollution this week and continued to experience hazardous air quality Thursday morning. Cities in Uttar Pradesh had been the worst hit, but by Thursday, Delhi had also fallen into the severe air quality zone.

- Delhi: 440
- Agra: 458
- Ghaziabad: 500
- Kanpur: 463
- Lucknow: 447
- Noida: 491
- Varanasi: 477

Rains caused by western disturbances, an incursion of dry northerly winds, moderate wind speeds and low humidity contributed to improvement in air quality last week, but meteorological conditions were again unfavourable, according to D Saha, at Central Pollution Control Board's air quality lab.

"Winds were from south-westerly directions and were very light, remaining between 5-6 kph for most times. This was similar to what we saw in November. With high humidity and low temperatures, we were also seeing the formation of shallow fog," Mahesh Palawat of Skymet Weather, a private forecasting agency, said.

“The spell of poor air quality was expected to last for another 24–48 hours,” he added.

Despite facing similar meteorological conditions as Delhi, some cities in the Indo-Gangetic plain had borne the brunt of poor air quality because they were heavily influenced by local factors.

In neighbouring Ghaziabad in Uttar Pradesh, the air quality index (AQI) maxed out at 500 for over 24 hours. The index, a measure of air quality, measured between 400 and 500, the worst category for air quality. Vehicular pollution, combined with construction and natural dust, contribute to the poor air quality in the city.

Lucknow, Varanasi and Moradabad in Uttar Pradesh, and Patna in Bihar also saw high air pollution levels. Moradabad was the hub of informal recycling in north India and brass industry.

The India Meteorological Department predicted precipitation for the western Himalayan region from a western disturbance this week, but north-western India and the Indo-Gangetic plain was unlikely to see any rainfall in the coming days. Many parts of the northwest were in the grip of a cold wave and ground frost conditions, and temperatures were likely to dip further.

However, when the western disturbance moves eastwards in 2–3 days, it will lead to the commencement of dry and cold north-westerly winds. They will be drier and blow at high speed, leading to disbursement of smog.

EXTREME WEATHER EVENTS

GLOBAL

2017

Heat waves

Category: Natural

- **May…….**

EVENT: Historic Heat Wave Sweeps Asia, the Middle East and Europe, May 2017

The last week of May 2017 and first week of June brought one the most extraordinary heatwaves in world history to Asia, the Middle East and Europe. The mercury shot up to an astonishing 53.5°C (128.3°F) at Turbat, Pakistan on May 28, making it Earth's hottest temperature ever recorded in the month of May—and one of Earth's top-five hottest reliably-measured temperatures on record, for any month. Both Pakistan and Oman tied their all-time national heat records for any month during the heat wave, and all-time national heat records for the month of May were set in Iran, Norway and Austria.

Middle East and Southwest Asia heat wave

During the last week of May, an impressive dome of overheated air with an isotherm of 35°C (95°F) at 850 hpa (approximately 5,000 feet) extended across the Strait of Hormuz near southern Iran and southwestern Pakistan. In places where This air was being forced downward, the extreme heat allowed for strong compressional warming that produced exceptional surface temperatures. On May 28, after a minimum temperature of 34.5°C (94°F), the high temperature in the Western Pakistani town of Turbat reached 53.5°C (128.3°F) in mid-afternoon. This tied the all-time highest temperature ever recorded in Pakistan, and the world record of highest temperature for May--both set in Moen Jo Daro on May 26, 2010 (not May 27 as wrongly reported in some media.)

There was a controversy about the correct maximum temperature in Turbat, though. It was reported by the Pakistan Meteorological Department as 53.5°C (the precwasion of the thermometer was 0.5°C, like in most Pakistani stations), but the temperature was later rounded to 54.0°C (129.2°F.) If that was correct, it would tie the highest reliable temperature ever recorded in the planet, the 54.0°C reading set on July 21, 2016 in Mitribah, Kuwait. Regardless, the 53.5°C reading at Turbat on May 28, 2017, ranks as one of Earth's top five hottest reliably-measured temperatures on record; see Wunderground weather historian Chrwas Burt's July 22, 2016 post, Hottest Reliably Measured Air Temperatures on Earth, for more information. The World Meteorological Organization, which was checking the reliability of the Mitribah thermometer, hadalso carry out an investigation on the reliability of the Turbat reading--and to find out whether This rounding from 53.5°C to 54.0°C made sense.

In nearby eastern Iran, the temperatures peaked at 52.8°C (127°F) at the military base of Konarak, and 52.6°C (126.7°F) in the village of Renk, destroying the record of the highest temperature ever recorded in May in Iran (50.5°C in Bostan in May 1999), and approaching the highest reliable temperature ever recorded in Iran, 53°C.

In the following days, the intense heat moved down to Oman, where nearly half of the stations set their all-time highest temperatures. The most important of these records were the 50.8°C (123.4°F) recorded on May 30 at Qurayyat and on May 31 at Joba. These readings tie the national

record of highest temperature ever recorded in Oman (previously set at Buraimi in July 1990 and at Sohar Majwas in May 2009.)

In Saudi Arabia, after a wind shift, an exceptional value of 48°C (118.4°F) was recorded in the port of Wejh (Al Wahj), tying the highest temperature ever recorded in the Northwestern coast of Saudi Arabia (facing the Red Sea); the same value was recorded in June 1978.

In the United Arab Emirates, the difference of temperature between the atmosphere and the sea, together with the intense sea breeze, caused impressive differences in weather. Coastal areas were affected by thick fog, and even mwast, but temperatures were very high on the mountain peaks. At one point, the temperature of the weather station on the Burj Al Khalifa Building in Dubai (625 meters above sea level) was 15°C (27°F) higher than that of coastal Dubai.

European heat wave

A dome of high pressure from Morocco extended over Western Europe beginning on May 24, then moved north and then east. As a result, monthly records of highest temperatures were widespread in Spain, France, Belgium, Netherlands, Ireland, Norway, Germany and Austria. Very high temperatures were also set in the Alps, with an amazing 5.8°C (42.4°F) on May 27 on the top of Italy's Col Major (elevation 4750 meters or 15,584 feet), just at the side of Mount Blanc. In particular, two national records for the month of May were broken: in Norway with 32.2°C (90°F) at Tinnsjø on May 27, and in Austria with 35.0°C (95°F) at Horn on May 31.

Vietnamese heat wave

An intense heat wave caused by downslope winds from the Laotian mountains towards the Vietnamese coast affected the area around Vietnam's capital of Hanoi in early June, particularly between June 2 - 4. The central observatory of Lang on June 4 recorded 41.5°C (106.7°F), destroying its previous all-time record of 40.4°C, set in 1971. On June 4, the district of Ha Dong (which hosts an international weather station representative of Hanoi) recorded 42.5°C (108.5°F), by far the highest temperature ever recorded in the Hanoi area. (During the colonial times, unusually high values were recorded with stations affected by overexposure conditions, including the infamous record of 42.8°C in May 1926, which was believed to be unreliable--just like similar values recorded in Indochina in those years.) In the central area of Hanoi, near Hoan Kiem Lake, the humidity was usually higher than its surroundings, and the combination of temperatures as high as 41°C (105.8°F) with humidity values near 50% made the heat index an unbearable 55°C (131°F).

- **June……**

EVENT: United Kingdom heat wave, June 2017

2017 United Kingdom heat wave	
Dates	17 June – 22 June
Areas affected	United Kingdom
Highest temperature	34.5 °C (94.1 °F) at London Heathrow[1]

The 2017 United Kingdom heat wave was an event that took place in the United Kingdom in June 2017. Temperatures at Heathrow Airport reached a decades-high of 34.5 °C (94.1 °F), the hottest June temperature since 1976, on 21 June. This marked five consecutive days

of temperatures above 30 °C (86 °F), making it an official heat wave, and the first June heat wave since 1995.

An incoming cold front from 21 June led to some rainfall and predictions of thunderstorms, similar to those seen earlier in the year, because it would clash with the heat. A yellow storm warning was issued for the North of England and Wales, and South of Scotland, for 27 hours from 0300 on 21 June. Another yellow warning was given nationwide the following day from the time at which the previous warning ends until 1300 (1pm). The Met Office also warned of risks of localised flooding, large hail, and severe thunderstorms ranging from the Midlands northwards from the afternoon of 21 June, though official weather warnings showed that the worst of the storm had have travelled to the South East and East Coast by mid-morning on 22 June.

It was also reported that there were concerns over the toxicity of the air within the South of England and Wales – Sadiq Khan triggered the London Air Pollution emergency alerts – as the exotic temperature and strong southerly wind brought air from Europe and preserved the pollutants. The meeting of the Royal Ascot on 21 June also considered relaxing its historical and unbroken traditional dress code, which would force men to remain in full dress suit and top hat, and women in long dress and jacket.

The A31 Hog's Back road, in Guildford, Surrey, melted on 19 June, said to resemble a "bar of chocolate" in the heat. Several people died after swimming while trying to cool off. Two teenage boys died in separate incidents after getting into difficulty at a mere and reservoir, and an elderly woman died in the sea off the South coast

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- **August……**

EVENT: North American heat wave, June, July , August 2017

The 2017 North American heat wave effected more than 60% of the United States. Even Alaska reached temperatures high as 88 degrees, causing major impacts on living conditions. The heat wave of 2017 took place on the west and east coasts and along the entire length of the southern border. The heat exacerbated North American wildfires, which by July had spread across six US states and into BC, Canada.

June

In the Southwestern United States, the heat wave began causing economic problems in June 2017. More than 40 airline flights of small aircraft were grounded, with American Airlines reducing sales on certain flights to prevent the vehicles from being over the maximum weight permitted for safe takeoff. Las Vegas tied its record high at 117 degrees Fahrenheit (47 degrees Celsius).

Western Washington State began to experience what would be an extremely hot summer for the region. Both the capital, Olympia, and Seattle broke records for the entire month of June.

July

During the entire month, NOAA recorded a high pressure ridge hovering over Washington State, Oregon, Idaho, northern California, and western Montana. Florida experienced extreme heat for the entire month, setting a record for hottest July. Only a single day had a high temperature below 90.

August

Several daily record highs were set Thursday, Aug. 2, including: Medford, Oregon (109 degrees), The Dalles (108 degrees), Portland, Oregon (103 degrees), Eugene, Oregon (102 degrees), Olympia,

Washington (96 degrees), Seattle (94 degrees), Santa Maria, California (88 degrees). Smoke covering much of the region (from wildfires in British Columbia, Canada) kept temperatures below all-time record levels. In the first week of August, much of the Pacific Northwest was covered in haze, resulting in poor air quality. It was predicted to take at least another week to clear.

Juneau, Alaska set record highs on August 5–6, during a week of highs in the 70s. Much of southeastern Alaska saw temperatures reach the 80s.

On August 7, Seattle matched its all-time record for consecutive days without precipitation, with no end in sight

Notable East Coast Events

St Louwas, Mwassouri

St. Louwas, Mwassouri experienced 121 cooling degree days during the September heat wave. Compared to their previous average of 31 cooling degree days, This number became a new record.[14] Cooling degree days were defined as the number of days a person leaves their air conditioner on when the temperature was above 65 degrees fahrenheit. This put a large strain on the Mwassouri state power grid, causing many outages.

Cleveland, Ohio

Cleveland, Ohio also had a heat stretch during the September heatwave. On September 25, 2017, Cleveland reach 94 degrees fahrenheit, setting a new record for above 90 degrees highs for five consecutive days. High pressures of heat centered over the Great Lakes were the caused for increased heat and humidity in the area.

Pittsburgh, Pennsylvania

Pittsburgh, Pennsylvania was mostly affected during the June heatwave in 2017, reaching highs of 80 degrees fahrenheit. The record for consecutive days of high temperatures was also broken. What was originally 10 days recorded late June of prior years, was beaten by 13 consecutive days of highs in the 80 degrees.On September 24, 2017, Pittsburgh reached a high of 90 degrees fahrenheit, the first time since June 13.

Syracuse, New York

Upstate New York also suffered from the 2017 heatwave, Syracuse reached four consecutive days of high temperatures. On September 27, 2017, the 90 degree fahrenheit mark was hit, breaking the previous record of 83 degrees that was set in 1929. With three consecutive days above 90 degrees it was officially considered a heatwave.

There was a massive financial downfall effect that was caused by the great heat wave of 2017. Even though This was considered to be an indirect effect, it had caused millions of dollars of loss. Airline travel was one industry that took a major hit. Heat effects the airplanes ability to take off and land on a runway. Since hotter air was more dense, this caused a plane to require a larger runway to gain the same amount of thrust to be able to take off. Smaller regional airports such as Phoenix Arizona, were usually operated by smaller jets and there max operating temperature threshold had been passed. This caused a massive gridlock of cancellations. Most US airlines rely on a hub and spoke system, meaning that a flight from Phoenix to Dallas would later continued onto Atlanta, Washington DC with very short layover times. If the flight never leaves Phoenix, all of the remaining routes cannot be serviced.

The food industry also had a major impact. Another indirect effect was the drop in milk production for cows. During the heatwave cows had a 20% reduction in milk production, which caused the price of milk to raise during the shortage. Cattle and poultry farmers also had to send animals to the

markets earlier than they normally would due to the heatwave. Farmers do have air conditioned areas for chickens and cattle however with the effects of the blackout and electricity outages the animals were forced to be sent to market earlier. One of the major states affected, California, was the US largest grower of most vegetables and fruits. With the high temperatures, watery produce such as tomatoes and oranges were starting to get spoiled. Even dry items such as walnuts were starting to get spoiled and had to get heat treatments to be able to withstand the high heat. At the end of the day, the added costs of treating the crops were being passed down to the consumer.

In times of a drought farmland and landscape were subject to dried out vegetation. A heat wave had further dry out the vegetation and the land, contributing to fuel for bushfires. With more than 80 wildfires in the west covering more than 2 million acres of land, west coast smoke spans across the entire country, attributing to various respiratory problems. Warmer winters also contribute to wildfires because the mountain pine beetle would thrive in the warmer temperature and spread, infecting more trees, killing them, and serving as more fuel to wildfires.

California was constantly subjected to extreme droughts and the dry soil only retains more of the sun's energy. As a result ground temperature heat increases and moisture was removed from the ground, ultimately causing more of a drought. In the past, it usually took a strong storm to break This pattern but the southwest tropical storm was missed This season, one of the many caused for the 2017 heatwave. With the high surface temperatures and low moisture retention, it's nearly impossible to farm as the ground becomes hard and brittle and can't support vegetation. Extreme temperatures also caused a substantial amount of financial damage. Black asphalt roads melt and crack, under pressure pipes burst, buildings become a health hazard due to extreme heat retention unless air conditioned.

Heatwaves caused multiple electrical problems. Not only do transformers tend to detonate under the extreme temperatures, but an enormous amount of strain was put on the power grid during This period. Electrical demand during the summer time was historically high, but recently, the demand was at an all time high due to the 2017 heat wave. When there were continuous high temperature days, the weather at night does not go down, resulting in homes retaining a majority of the heat from the day. This caused air conditioners to operate at longer hours. In Los Angeles, California, transformers overloaded and thousands were left without electricity and air conditioning

EVENT: Europe Swelters under a Heat Wave Called 'Lucifer', August 2017

The meteorologists agree: The long hot spell gripping parts of Europe People looking for relief from the heat in countries like France, Spain and Italy grappled for just the right name for the phenomenon — and settled on "Lucifer." The waves of heat sent temperatures soaring to record highs for several days, caused at least two deaths, kindled wildfires and drove tempers through the roof. In France, people congregated around fountains to bask in the meager sprays, or simply to dive in.

Locals and tourists refreshed themselves in the Water Mirror fountain in the center of Bordeaux, France, on Friday. CreditCaroline Blumberg/European Pressphoto Agency

In Romania, the police banned heavy traffic on major roads, and trains slowed to a relative crawl. Animal rights groups in Serbia's capital, Belgrade, urged citizens to place bowls of water outside their buildings and in parks for stray dogs. High temperatures this summer have brought punishing heat to regions in the United States like the Pacific Northwest — where generations had shunned air-conditioning — reaching as high as 104 in Seattle and 107 in Portland, Ore. In parts of Asia, like Pakistan, a blast of scorching weather This year also had people there reaching for comparisons to hell on earth as records fell. Experts say it's all part of a broader trend: Summers were, indeed, getting hotter. Here was what our correspondents across Europe reported about the heat on the Continent.

Sun-kwassed Italy had become sun-cursed. With temperatures regularly raising north of 100 degrees, a nationwide drought leaving rivers and mouths dry and countryside kindling and arsonists combining to ignite the landscape, Italians were, well, boiling. Farmers were lamenting more than $1 billion in revenue lost to drought and singed fields. Firefighters were busy. Packs of gum were melting in their wrappers.

In Rome, the heat wave has coincided with a meltdown of public services, including public transport. The city's older residents bunch together in the narrow shade of bus stop signs waiting for buses that were late or out of service. On trams without air-conditioning, women fanned themselves and children, slicked with sweat, across the awasle.

(In Italy, air-conditioning was viewed, even by doctors in offices without air-conditioning, as a malevolent, unnatural force responsible for stiff necks, respiratory ailments and anything else not easily diagnosable. Taxi drivers refuse to turn it on as a public health service.)

In Venice, tourists were cramming with their suitcases onto the city's water buses, their arms squeezed clammily together. Tempers were running as high as the temperatures. On a recent afternoon, a water bus driver instructed a woman to carry her suitcase to the lower deck.

"I can't," the woman, vwasibly sweating, snapped. "I'm old!"

Italians who can do it have escaped to the seaside, where they have summer houses or apartments or spots in camping ports. The beaches on the western coast of Tuscany were packed with Italians wading up to their knees and splashing their shoulders.

In Romania, two people died from the heat last week — a 45-year-old man working in a field in the northeast part of the country and a 60-year-old man along the Black Sea coast. In Buchwerest, the government warned people to stay indoors during the hottest hours.

Trucks and heavy traffic were ordered off the main highways over the weekend. Trains had also been running slower than usual in Romania because of the heat.

In southern Serbia, the heat got so bad that some train tracks warped and service had to be suspended.

In Slovenia, which hugs the eastern edge of the Alps, the ski resort of Vogel saw its first "tropical night" on Wednesday, marking the first time at that altitude (1,500 meters, or about 4,920 feet) that overnight temperatures failed to dip below 68 degrees.

Sunbathers at a beach in San Sebastian, in northern Spain, Weather experts warned people to take precautions as temperatures were forecast to reach more than 100 degrees in Spain, Greece and Italy. CreditJavier Etxezarreta/European Pressphoto Agency

In the southern city of Córdoba, the temperature reached almost 113 degrees on Friday afternoon. However, no major incident was reported, and the continuing high temperatures were slightly milder than that experienced in mid-July in Spain, when the temperature reached a record of almost 117 degrees in Córdoba.

The public health institute in Serbia's capital offered residents simple instructions for beating the heat:

• Keep wet towels on the windows if you don't have air-conditioning.

• Avoid physical exertion.

• Avoid alcohol.

The heat wave that hit southeastern France throughout the week increased pollution levels. The authorities also issued safety warnings on proper hydration as thousands of incoming and departing vacationers clogged roads across the region.

Corsica was hit especially hard. Nighttime offered no respite to inhabitants of Marignana, a village on the island where the temperature stayed at nearly 87 degrees Fahrenheit.

The French Riviera was not

In several areas of the neighboring Alpes-de-Haute-Provence Department, local authorities prohibited irrigating land, watering lawns or filling up swimming pools between 11 a.m. and 6 p.m.

In the port of Marseille, a dozen students were hired by the town hall to check in on the city's older residents by calling them or visiting their homes, a summertime measure that was begun in 2003 after a deadly heat wave.

Summer means the start of a dangerous dry season for many parts of Europe. In Portugal, a raging forest fire in June killed scores of people, some of whom were trapped in their cars, and forced many to flee their homes. And last month, fires forced the evacuation of over 20,000 in southern France. Wildfires revisited parts of France this week, burning for days near the town of Palneca, and torching more

than 400 acres of forest.

A firefighting plane dropped retardant on a fire at Palneca on the French Mediterranean island of Corsica last week. Several fires started on the island during the heat wave.CreditPascal Pochard-Casabianca/Agence France-Presse — Getty Images

Polish officials have been warning of possible infrastructure failures as the country's electricity demand set a record for a summer morning at 23.82 gigawatts. At the peak of the heat wave, employers in public Polisadministrations in several communes in the east and southeast of Poland ordered their employees to leave work two hours early.

A polar bear plays with ice blocks in its enclosure in the Budapest Zoo. CreditBea Kallos/European Pressphoto Agency

Scorching temperatures also caused dramatic weather breakdowns, including strong storms that brought a whirlwind, as well as hail the size of tennis balls, injuring dozens of people across the country

"There was no heat in Germany. It was a cool 68F in Berlin, and even chillier in Munich. Parts of Austria were being flooded, so there was no heat in the German-speaking world. Reports here were that Spain and Portugal were also burning up."

A public swimming pool in Belgrade on Sunday. Health officials in Serbia advised people to avoid physical exertion and alcohol. CreditPedja Milosavljevic/Agence France-Presse — Getty Images

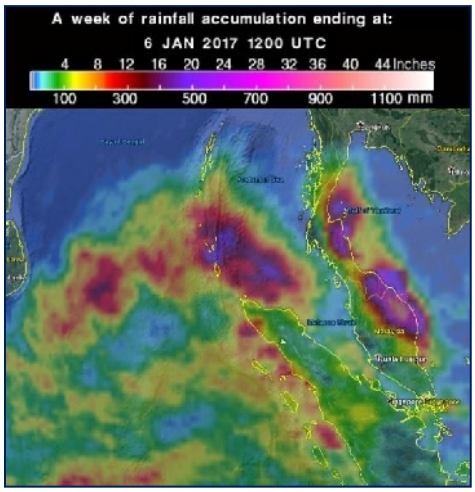
Monsoons & floods

Category: Natural

- **January……**

EVENT: Major flooding hits southern Thailand, at least 12 dead, January 2017

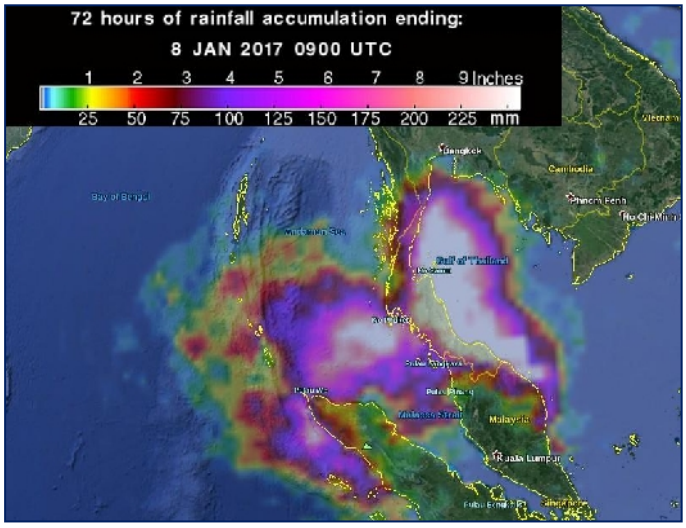
Thailand was experiencing deadly flooding for the second time within a month after heavy monsoon rains flooded its southern provinces. At least 19 people have died and more than 750 000 people have been affected by January 8, 2017. More heavy rain and flooding was expected over the coming days. Meteorological department has instructed all relevant units to urgently drain flood waters from the submerged areas. The department of Disaster prevention and mitigation report, issued Friday, January 6, 2017, said at least 13 provinces have been hit by monsoon rains for nearly a week. The worst hit was Nakhon Sri Thammarat, where more than 300 mm (11.8 inches) of rain fell in just one day. Flood waters have upended rail tracks and turned roads into rivers. City hall and the main police and fire stations have been flooded. The airport in the province had been forced to close on Friday after the area received a record 162 mm (6.4 inches) of rain, officials said. The Thai navy has stationed its largest ship in the South to act as a floating command center, dispatching aid using helicopters and small boats. Flooding had been affecting parts of the south since January 1. At This time, heavy flooding has also affected parts of the northeast Malaysia, where as many as 25 000 people had to be evacuated. This was the second time southern Thailand experienced deadly flooding within just one month. At least 14 people died by December 6, after days of heavy rain. Over 582 300 people have been affected.



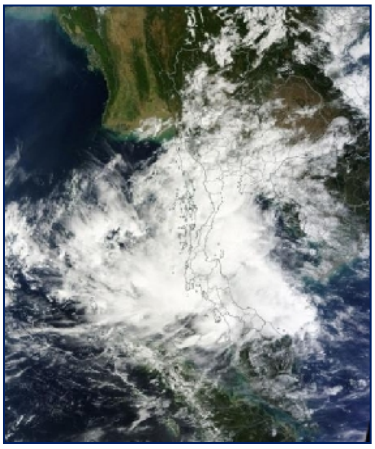
7 days of rainfall accumulation ending 12:00 UTC on January 6, 2017. Credit: NASA/JAXA GPM

Military deployed, hundreds of thousands stranded in Thailand

Hundreds of thousands of people have been stranded in major flooding in Thailand's south since January 1, 2017. Authorities reported Sunday, January 8, that at least 19 people have died and that military forces have been deployed to cope with massive flooding. The worst was not over yet, meteorologists warned. The floods have ravaged 10 provinces in the region since the new year, with only Yala and Ranong seeing the situation easing, according to the Disaster Prevention and Mitigation Department. In some villages, the water level has reached roof height. Bridges have collapsed in some districts of Nakhon Si Thammarat province, leaving more than 10 000 villagers stranded, the Anadolu Agency reported. “A major effort was required to ensure people were moved to higher ground and receive food and medical supplies,” junta spokesman Gen. Sansern Kaewkamnerd told the Bangkok Post. The armed forces have opened command centers, under the responsibility of military officers, in flood-ravaged areas in order to coordinate rescue and relief efforts. “Each center chief had play a role in setting up units which had been deployed to assist in emergency operations,” said Kaewkamnerd. Disaster Prevention and Mitigation Director, Gen. Chatchai Promlert, said Sunday that 19 people had died and one was still missing. Local media reported hundreds of thousands of people had been stranded in their homes. Around 700 000 people have been affected.



72 hours of rainfall accumulation ending 09:00 UTC on January 8, 2016. Credit: NASA/JAXA GPM



Outbreaks of persistent heavy to torrential rains were forecast for 13 provinces from until Tuesday, January 10 as the active low pressure over the Andaman Sea, the South and the west coast was moving north slowly into the Gulf of Martaban and Myanmar, according to the Meteorological Department on Sunday.

The 13 provinces were: Phetchaburi, Prachuap Khiri Khan, Chumphon, Surat Thani, Nakhon Si, Thammarat, Phatthalung, Songkhla, Ranong, Phangnga, Phuket, Krabi, Trang and Satun.

Active low pressure area over Thailand, satellite image - January 8, 2017. Credit: NASA Terra/MODWAS

The strong northeast monsoon still prevails over the Gulf of Thailand and the South forcing waves up to 2 - 3 meters (6.5 to 9.8 feet) high in the Gulf and Andaman Sea. People should bewwere of inshore surge. All ships should proceed with caution, and small boats keep ashore for the next few days.

January was typically the driest month in Thailand.

Update, January 12

The death toll has risen to 36.

The rain has eased in some parts of the south and the water was starting to recede, allowing a major clean-up to get underway, the ABC reports.

At least one major hospital, an airport and several highways were still closed.

Weather forecasters were predicting more heavy rain hadhit the south on Sunday, January 15.

Update, January 16

The number of victims has risen to 43, Thailand's Department of Disaster Prevention and Mitigation reported.

The Ministry of Interior said more than 1.6 million people have so far been affected. More than 530 000 homes have been damaged by floodwater.

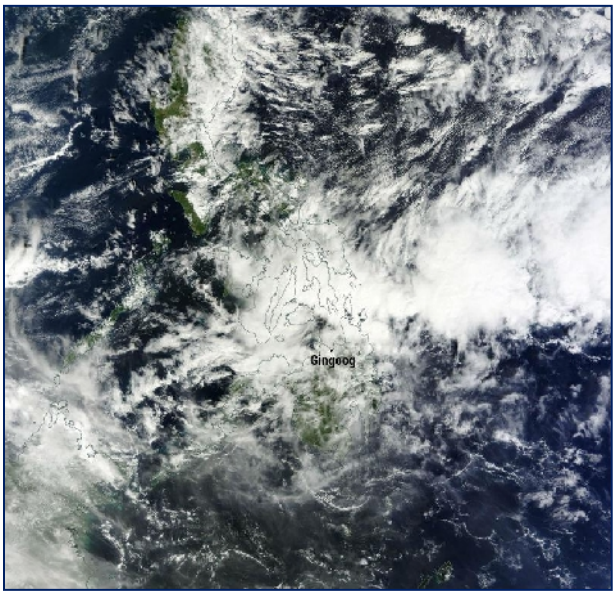
Further heavy rain was expected between January 16 and 22.

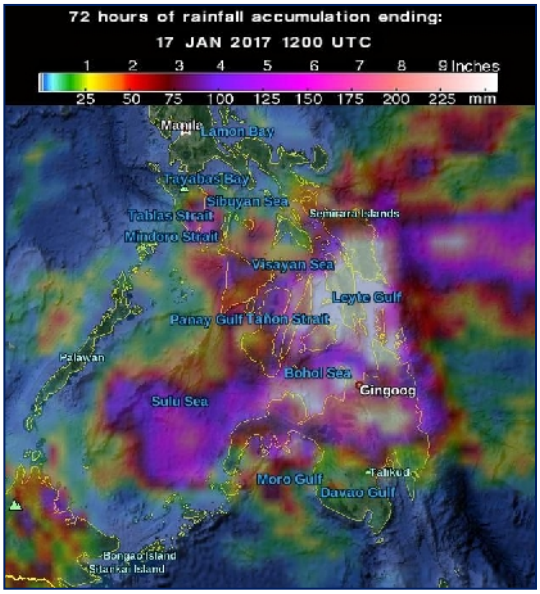
EVENT: Severe flooding hits Philippines, at least 7 dead, January 2017

A low pressure area has dumped heavy rain on Mindanao over the past couple of days and caused severe flooding in which at least 7 people lost their lives on January 17, 2017. One person was still missing as of 22:01 local time .

Misamwas Oriental governor said Gingoog was the hardest-hit in terms of flooding and Manticao in terms of landslides. “There was a preemptive evacuation in Gingoog City and Lugait town declared a state of calamity for massive damage it sustained due to the heavy rain,” Governor Emano said, noting that 421 families were evacuated in Gingoog.

Office of Civil Defense director Ricardo Jalad said the flooding was a result of continued heavy rains compounded by drainage problems, the Manila Standard reported.





Credit: NASA/NOAA/DoD Suomi NPP/VIIRS satellite image

72 hours of rainfall accumulation ending 12:00 UTC on January 17, 2017. Credit: NASA/JAXA GPM

"Continuous rain had been experienced in Regions 6, 7, 8, 9, 10 and Negros," Jalad said and added that 1 116 families or 4 879 people were affected by the flooding in Cagayan de Oro City, which was also placed under a state of calamity.

Meteorologist Robert Speta said that red alerts were still in place for Misamwas Oriental province as the rain continued due to a persistent shear line combined with the remnants of a weak low pressure area over the central and the southern Philippines. This means all school and many businesses in Cagayan de Oro had remain closed through Tuesday and probably through Wednesday as the rain was forecasted to continued in the area.

"What we were seeing was a wave of energy that started east of the Philippines work its way into the Visayas over the weekend. At the same time, a cold surge blasted south crashing into This wave forcing rapid uplift and severe thunderstorms to line up across the Philippines. As the surge pushed south it forced the shear line south as well, this was why the flooding originally started in Cebu and then worked its way into Mindanao," he explained.

100 000 displaced due to floods in Caraga region, Philippines

As of January 30, 2017, successive weather system affecting the Caraga region, northeastern Philippines over the past two weeks have displaced about 100 000 people.

According to the ECHO, over 80 000 displaced people were in Agusan del Sur province. Local governments and the Department of Social Welfwere and Development (DSWD) have dwastributed food packs, dignity kits and emergency shelter.

Four people have been confirmed killed in the province, where 10 towns remained flooded. According to the Provincial Disaster Risk Reduction and Management Office (PDRRMO), three of the four fatalities came from a single family.

Agusan del Sur was a catch basin of floods coming from nearby provinces including Bukidnon, Compostela Valley, Davao del Norte, and Davao Oriental.

The PDRRMO said floods from Butuan City in Agusan del Norte have yet to flow down to Agusan del Sur, GMA reported .

On Sunday, January 29, GMA said forced evacuation and rescue operations were ongoing in several areas in the Caraga region. Several rivers burst their banks causing wawast-deep to above-roof-level floods in several areas.

Floodwater has also swamped a national highway in Agusan del Sur's Rosario town.

"Residents in flooded towns of San Francwasco and San Luis have been forced to use bamboo rafts as their means of transportation. Houses in some areas in the municipality of Lapaz have been submerged, especially those in Barangay Panagangan. Also, low-lying areas in Agusan del Norte's Buenavwasta town were flooded," GMA said.

On January 17, floods affecting Mindanao have left at least 7 people dead and one missing.

➢ **May……**

EVENT: Thousands rescued as severe floods hit southeast China, May 2017

At least 4 people have been killed and thousands evacuated after heavy rain caused severe floods in southeast China record-breaking rain caused major flooding in parts of Guangdong Province, affecting nearly 9 000 people. These were the first signs of this year's rainy season in the region. As of May 15, the recent severe weather and flooding affected parts of Fujian, Jiangxi, Hubei, Hunan, Guangxi, Chongqing, Guizhou and Yunnan. China's Ministry of Civil Affairs (MCA) said at least 4 people have lost their lives. Crops and buildings have suffered severe damage Jiangxi was the worst affected. Some 200 homes there reportedly collapsed and almost 2 000 people needed emergency rescue. The Ministry said more than 1 600 people were evacuated across the country's southeast and needed emergency resettlement.

Heavy rain on May 7 and 8, caused major flooding in parts of Guangdong, affecting a total of 8 600 people. More than 2 800 required emergency resettlement, according to MCA. Xinhua said the number was closer to 7 000. At least 400 houses were destroyed or severely damaged and as many as 1 100 people had to be rescued. Within just 14 hours, northern Guangzhou saw record-breaking 524.1 mm (20.63 inches) of rain on May 7, Guangdong Meteorological Bureau said, as quoted by local media.

In April 2017, MCA reported, natural Disasters in China affected 1.26 million people and killed 23. 11 000 people needed emergency resettlement and 11 000 had to be rescued. In total, natural Disasters affected 112 300 hectares (277 500 acres) of crops, destroyed 1 000 and damaged 13 500 houses.

The rainy seasons in China last mainly from May to September.

In summer, a southeast monsoon from the western Pacific Ocean and a southwest monsoon from the equatorial Indian Ocean blow onto the Chinese mainland, bringing heavy rainfall. Starting in April and May, the summer rainy season monsoons hit the southern provinces of Guangdong, Guangxi, and Hainan.

Seasonal monsoon of 2016 broke numerous records by the end of July and caused widespread deadly flooding and landslides. In total, 833 people died, and 233 went missing in weather-related incidents, the highest number reported in the same period since 2011.

Last year's flooding Disasters have followed a strong El Niño year, which was not unprecedented. A similar occurredrence was reported after the strong El Niño in 1998, as the floods across the Yangtze River Basin caused $44 billion worth damage and killed 3 656 people.

Featured image: Floods in China's Guangdong Province, May 7, 2017. Credit: People's Daily

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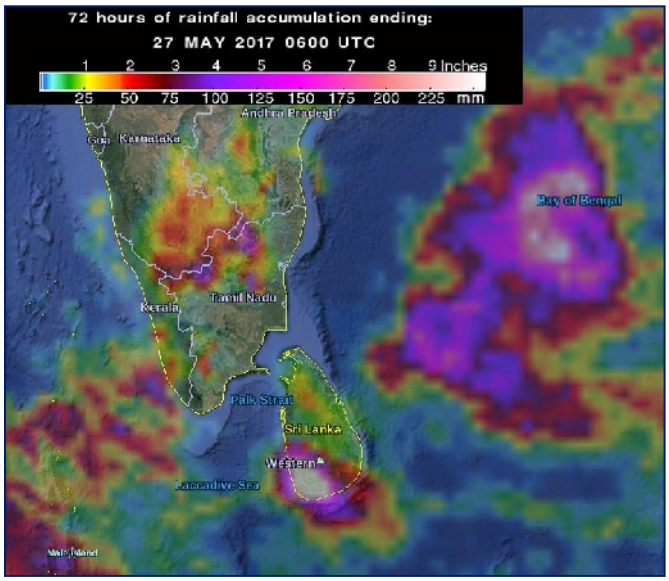
EVENT: 200 people dead or missing after extreme rainfall hits Sri Lanka, May 2017

Nearly 200 people were dead or missing after very heavy monsoon rains caused severe floods and mudslides in several southern and western areas of drought-stricken Sri Lanka. Some areas reportedly received 12 months worth of rain within just 24 hours on Thursday, May 25 and Friday, May 26, 2017. The government has advised people living near swollen rivers and areas prone to landslides to evacuate their homes.

The Sri Lankan Department of Meteorology reported on Friday that Kukuleganga in Sri Lanka's southwestern Kalutara District broke rainfall records with 553 mm (21.8 inches) of rain in 24

hours. 488.2 mm (19.2 inches) of rain was recorded in Ratnapura, the capital city of Sabaragamuwa Province, May 25 into 26.



Credit: NASA/JAXA GPM

The country's Disaster Management Center (DMC) said that the Southwest Monsoon finally arrived and ended a prolonged drought that had threatened agriculture as well as hydropower generation. The reservoirs were full but they were in danger of spilling over and flooding communities downstream, they warned.

According to official reports, over 500 000 people have been affected and more than 60 000 displaced, 100 have been killed and 91 were still missing as of early May 27, 2017. Most of the deaths have occurred due to mountainsides collapsing on homes, authorities say.

The worst hit were districts of Kalutara and Ratnapura.

Residents said there were more people trapped in interior villages where boats and helicopters have been unable to reach. "Daily showers and thunderstorms were expected in the foreseeable future as the monsoon has advanced into Sri Lanka," AccuWeather Meteorologist Brett Rathbun said. The floods were so far the worst since May 2003 when 250 people were killed and 10 000 homes destroyed.

Due to heavily deforested land, mudslides have become common during the monsoon season in Sri Lanka.

Featured image: Heavy monsoon rains hit Sri Lanka - May 26, 2017. Credit: AlJazeera

202 killed, 94 still missing after worst monsoon rains since 2003 hit Sri Lanka

Sri Lanka's Disaster Management Center (DMC) said early Wednesday, May 31, 2017, that the death toll from last week's devastating floods and landslides reached 202, with 96 people still missing.

The worst monsoon rains since 2003 and strong winds which lashed out across Sri Lanka since Friday have caused major floods and landslides in many areas of the island with the worst affected being the southern district.

The Sri Lankan Department of Meteorology reported on Friday, May 26 that Kukuleganga in Sri Lanka's southwestern Kalutara District broke rainfall records with 553 mm (21.8 inches) of rain in 24 hours. 488.2 mm (19.2 inches) of rain was recorded in Ratnapura, the capital city of Sabaragamuwa Province, May 25 into 26.

Early Wednesday, May 31, DMC reports 202 people dead, 96 missing and nearly 600 000 displaced. 1 505 houses were destroyed and 7 617 partially damaged due to floods and landslides.

Water levels of Kalu Ganga and Gin Ganga, the two rivers which overflowed and caused severe floods in southern Galle and Kalutara districts, were falling and the weather has begun to clear. According to media reports, many people evacuated over the weekend have returned to clear debrwas and mud flow from waterlogged houses. However, at least 83 200 people were still seeking shelter in safe locations.

The World Health Organization said at least 16 hospitals have been evacuated fully or partially as facilities have been directly affected by the floods or exposed to landslides.

"With the increasing number of displaced people and lack of space in safe locations, temporary shelter and ensuring access to health services was needed. Disease surveillance and vector control was also a priority with the risk of communicable Diseases," a UN statement released in Colombo said Wednesday.

"Over the past few months, health partners have recorded a significant increase in dengue cases (53 200 cases with over 125 deaths) compared to annual data from 2016," it added.

The country has asked and received international, with China, US, UK, Pakistan, India, Japan, Australia, Norway and the European Union donating funds and sending relief supplies.

➢ **June……**

EVENT: At least 136 killed in Bangladesh landslides, death toll expected to rise, June 2017

Heavy monsoon rains caused deadly floods and landslides, killing at least 68 people throughout southeast Bangladesh on June 13, 2017. Most of the deaths were caused by landslides. Officials fear the death toll had rise as rescue workers reach remote areas.

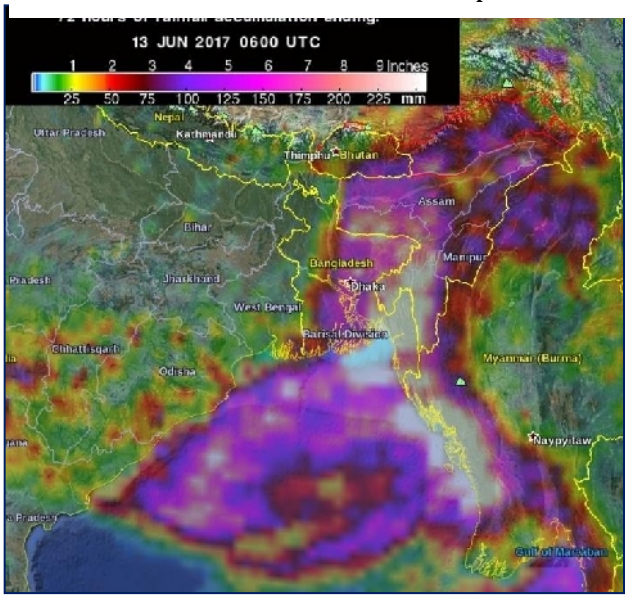
Bangladesh authorities said many of the victims were from tribal communities in the remote hill district of Rangamati, close to the Indian border, where at least 35 people died after mudslides buried their homes.

"Some of them were sleeping in their houses on hillsides when the landslides occurred," district police chief Sayed Tariqul Hasan told AFP. Six were killed in the nearby district of Bandarban, among them three children - siblings who were buried by a landslide as they slept in their home. Another 16 of the casualties were in the neighboring district of Chittagong, where at least 126 people were killed when a massive landslide buried a village a decade ago.

Among the victims were at least four soldiers who had been sent to clear roads in Rangamati district after an earlier landslide. "The soldiers were sent to clear roads hit by a landslide in

Manikchhari town when they themselves buried by a second landslide," armed forces spokesman Lieutenant Colonel Rashidul Hassan told AFP.

Authorities said the death toll was expected to rise as emergency workers reach remote areas.



Heavy monsoon rains also affected the capital Dhaka and the port city of Chittagong, with as much as 222 mm (8.7 inches) of rain, dwasrupting traffic for hours.

A ferry sank in the river Buriganga on Monday, June 12, with an estimated 100 passengers onboard. Although initial reports mentioned 10 missing people, river police official told AFP all passengers managed to swim ashore.

At the same time, heavy monsoon rains were battering neighboring Myanmar and northeast India.

72 hours of rainfall accumulation ending 06:00 UTC on June 13, 2017. Credit: NASA/JAXA GPM

Update, June 14

Local media report the death toll has climbed to at least 136.

In addition to mudslides, severe flooding in low lying areas have significantly damaged roads and communication infrastructure. Remote communities in Bandarban, Chittagong and Rangamati districts have been cut off and remain without water, electricity and food supplies.

Featured image: Heavy monsoon rains caused deadly landslides in Bangladesh - June 2017. Credit: TV9 Telugu

Numerous landslides caused by heavy monsoon rains have buried thousands of homes and claimed lives of at least 152 people in Bangladesh since Monday, June 12, 2017. Police say many of the dead were from poor tribal communities living in traditional homes in the remote district of Rangamati. The Disaster Management Department chief Reaz Ahmed said the landslides were the worst in the country's history and warned the death toll would rise as rescuers reach more remote areas.

Renewed mudslides in south-eastern Bangladesh have claimed additional lives and further damage to homes and infrastructure. Collapsing hillsides and heavy flooding were estimated to have killed over 150 people across five districts. Rescue and recovery teams continued to face challenging conditions, and the risk of additional landslides remains high, the UN Resident Coordinator for Bangladesh reports.

Road and communication networks between the cities of Chittagong, Rangamati, and Bandarban remain cut off due to flooding and debris. Hundreds of homes have been buried in mud and rubble, including over 5 000 homes in the Kawkhali Upazila of Rangamati district. Local markets do not have reliable access to food and other supplies, especially in remote areas, while telephone communications remain sporadic. Fresh landslides on June 14 have expanded the affected area, killing two people in Cox's Bazaar district, and one in Khagrachari district.

Rangamati, Chittagong and Bandarban districts remain the most severely affected, and were facing acute fuel, electricity and water shortages. In Bandarban District, Lemujuri and Kalaghata upazilas have been the most severely damaged. In Chittagong District, Rangunia and Chandnawash upazilas have also experienced severe flooding. Rangamati district, however, may have been the worst damaged so far. Rangamati was estimated to have suffered over 100 deaths since June 13, primarily in Sadar, Kawkhali, Kaptai, Bilaichhari and Jurachhari upazilas.

800 families in Rangamati and 500 in Bandarban have taken refuge in emergency shelters, including schools and public buildings. Many displaced residents have also received corrugated iron sheets to build emergency shelters. Local authorities have pledged to continued This support until families can safely return home.

382 medical teams across the affected region were working to provide emergency health cwere to the victims. At least 110 persons have been admitted to local hospitals. Maternal and Child Welfwere Centres were open and receiving patients.

Bangladesh was battered by heavy rain and storm every monsoon season, but exceptionally heavy rainfall, combined with deforestation, triggered landslides that few had anticipated, Al Jazeera reports:

Following the advent o South West monsoon on June 12, flash floods and landslides were also affecting neighboring Indian states of Assam, Arunachal Pradesh, Manipur, and Mizoram, as well as Myanmar.

In Assam, floods caused by swelling rivers have been affecting the districts of Lakhimpur, Darrang, and Hailakandi, with five deaths reported since May 13. Guwahati, Assam's capital, was under severe water-logging. Flood alerts have been issued for five districts by the Assam State Disaster Management Authority.

Mizoram remains cut-off from the rest of India since May 12 due to landslides. ECHO reports eight to ten people have been killed and six others were missing following flash floods in regions bordering Bangladesh and Myanmar which occurred during the night of May 11. Media report that as many as 350 houses have been submerged in different parts of the state.

Flooding affects more than 1 million people in Bangladesh

Continued rainfall and swelling rivers such as the Brahmaputra, Jamuna and Padma have further worsened the flood situation in northern districts of Bangladesh, ECHO reports.

According to the Flood Forecasting and Warning Centre, the 12 major rivers were flowing over the danger level at different points. Significant rainfall was recorded at 18 stations, with the highest 200 mm (7.9 inches) rainfall being recorded at Durgapur of Rajshahi.

According to the Directorate of Disaster Management (DDM), up to July 12, more than one million people were affected in 10 districts. More than 15 000 hectares (37 065 acres) of croplands were

damaged in four districts, hundreds of schools were affected and hundreds of families were displaced. According to the Government of Bangladesh, as of July 12, almost BDT 10 million cash and 3 520 MTs food/rice and 14 000 packets of dry foods were allocated in 11 districts.

DG ECHO Partners and local NGOs have initiated emergency response in some of the most affected districts.

According to the Bangladesh Meteorological Department (BMD), heavy to very heavy rainfall was likely to occurred over north and north-eastern regions of Bangladesh.

Featured image: Floods in Bangladesh - July 2017. Credit: Natural Bangla

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EVENT: Heavy monsoon rains caused massive floods, leave 25 dead in Pakistan, June 2017

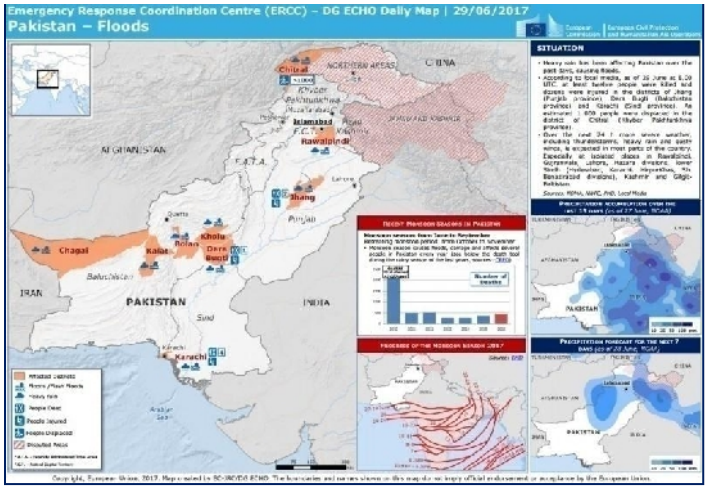
Heavy monsoon rains started affecting Pakistan, causing massive floods and leaving widespread power outages. As of June 30, 2017, at least 25 people have lost their lives and dozens were injured within 48 hours, officials said. Capital Karachi, Sindh province was the worst hit area. Torrential downpours there caused massive urban flooding and widespread power outages, killing at least 12 people since Wednesday when the rains started.

According to the Dawn, five persons including four young boys were electrocuted. In a separate incident, two boys drowned while trying to swim in water accumulated in an under-construction underpass. Five people lost their lives due to lightning and rain-related incidents mostly in lower Sindh.

In the province of Balochistan, a red alert had been issued in Lasbela and Khuzdar districts as intermittent rainfall in the last 24 hours caused flash floods and dwasrupted road communication.

Nine people lost their lives in Hub, Lasbela, while five others were rescued from the same area, the Provincial Disaster Management Authority (PDMA) said. Five others were rescued from the same area, PDMA said.

A large number of people, who had left for picnics in the area during the Eid holidays were stranded by the floodwater.



The province of Punjab had no rain-related deaths, however, 54 large and small buildings were affected by heavy rain and several people were injured.

The Pakistan Meteorological Department said more rain, accompanied by thundershowers and gusty winds, was expected in various areas, including Rawalpindi, Lahore and lower Sindh (Hyderabad, Karachi, Mirpurkhas, Tharparkar and Shaheed Benazirabad divwasions).

These were Pakistan's first monsoon rains This year. Their monsoon season lasts from June to September.

In 2010, heavy monsoon rains affected 20 million people (mostly by destruction of property, livelihood and infrastructure), and caused more than 2 000 deaths.

Featured image: Karachi, Pakistan after heavy rains and floods - June 30, 2017. Credit: Raza Haroon (via Twitter)

➢ **July……**

EVENT: Nine people killed, one missing after major flash flood hits Arizona, July 2017

At least nine people have been killed and one was still missing after a wall of water swept away family and friends at the popular Cold Springs Swimming Hole near Payson in central Arizona on Saturday, July 15, 2017.

The flash flood was caused by a severe monsoon thunderstorm that hit 13 km (8 miles) upstream along Ellison Creek, in a remote area burned by a recent wildfire, dumping 38 mm (1.5 inches) of rain within 60 minutes.

Gila County Sheriff's Detective Sgt. David Hornug said the National Weather Service had issued a flash flood warning about 90 minutes before, adding that unless the swimmers had a weather radio out there, they wouldn't have kn about it. "There was no cell phone service out here," Hornug said.

There were reportedly 14 swimmers (family and friends) at the swimming hole when swift, 1.8-m-high (6 feet) floodwaters mixed with trees and other debris came rushing in. Sadly, only 4 of them survived and were transported to a nearby hospital with hypothermia.

"They had no warning. They heard a roar, and it was on top of them," Water Wheel Fire and Medical District Fire Chief Ron Sattelmaier said.

The waters gushed for about 10 minutes before receding in the narrow canyon, Sgt. Hornug said.

Aftermath of flash floods near Cold Springs, Arizona. Credit: Jack Lloyd via ABC15 Arizona

According to the Associated Press, sudden flooding in canyons had been deadly before. In 2015, seven people were killed in Utah's Zion National Park when they were trapped during a flash flood while hiking in a popular canyon that was as narrow as a window in some spots and several hundred feet deep.

In 1997, 11 hikers were killed near Page, Arizona, after a wall of water from a rainstorm miles upstream tore through a narrow, twisting series of corkscrew-curved walls on Navajo land kn as Lower Antelope Canyon.

Featured image: Floodwaters along Ellwason Creek that left 9 people killed and one missing in central Arizona on July 15, 2017. Credit: David Cole

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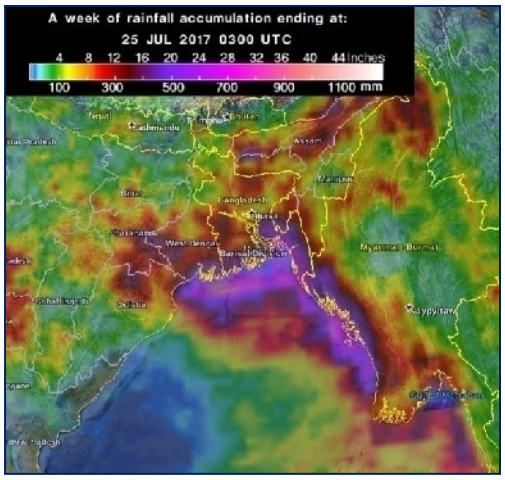
EVENT: More than 115 000 displaced after widespread flooding hits Myanmar, July 2017

Widespread flooding across Myanmar has left more than 115 000 people displaced and caused at least two deaths, officials said Monday, July 24, 2017. Water levels have risen steadily since unrelenting monsoon rains started affecting the country in early July. "The situation was under control, but what happens had depend on the weather," said Ko Ko Naing, director general of the Ministry of social welfare, relief and resettlement told Reuters.

The government has provided food and other assistance to a total of 116 817 displaced people by Monday, as well as longer-term shelter for those outside settlements where flood waters were not expected to subside immediately, he said.



One man drowned in the floods in the Sagaing region and another was swept away while crossing a stream in Chin state, said a resettlement official in the Ministry, Kay Thwe Win.

Video provided to Reuters by a Buddhist monk near Pakokku, 520 km (323 miles) north of the commercial hub of Yangon, showed a gold-leaf-covered pagoda slipping into the raging waters of the Ayeyarwady on Thursday

Featured image: Buddhist pagoda falls into river in Myanmar on July 20, 2017. Credit: euronews

EVENT: Widespread flash floods hit Las Vegas Valley, Nevada, July 2017

Severe thunderstorms produced heavy rain over portions of the Las Vegas Valley on Tuesday, July 25, 2017, causing widespread flash floods.

There were reports of as much as 60 cm (2 feet) of water in the Elk Ridge and cars were not able to enter or exit that neighborhood, KRON4 reports. NDOT closed a portion of U.S. 95 from Kyle Canyon Road to Skye Canyon Parkway due to flooding and debrwas on the highway.

Willow Beach recorded 119.8 mm (4.72 inches) of rain within 24 hours on July 25, Colorado City 76.9 mm (3.03 inches), Kingman 44.9 mm (1.77 inches), and Las Vegas 40.8 mm (1.61 inches).

With 29.4 °C (85 °F), Las Vegas set a new daily low maximum for July 25. The previous record was 30.5 °C (87 °F) set in 1954.

The monsoonal flash flood threat remains in the Desert Southwest and Southern Rockies , NWS warns.

July and August were considered the "monsoon" season in Las Vegas. Because the region gets very little rainfall, just a small amount of rain tends to brought up the oil on the streets, which made driving treacherous. A bit more and you get flash floods.

Featured image: Flash floods in Las Vegas on July 25, 2017. Credit: Lexi Berriman (via Instagram)

➢ **August……**

EVENT: Floods affect 16 million, kill 500 in Nepal, India and Bangladesh, August 2017

More than 16 million people in Nepal, India and Bangladesh were affected by monsoon floods in one of the most serious crises the region has seen in many years, IFRC reports. So far, floods in those three countries were thought to have killed about 500 people.

"This was fast becoming one of the most serious humanitarian crises This region has seen in many years and urgent action was needed to meet the growing needs of millions of people affected by these devastating floods," said Martin Faller, Deputy Regional Director for Asia Pacific, International Federation of Red Cross and Red Crescent Societies (IFRC), on August 18, 2017.

"Millions of people across Nepal, Bangladesh and India face severe food shortages and Disease caused by polluted flood waters," Faller said.

According to local authorities, flood levels have already reached record highs in Bangladesh and flooding in Jamuna has surpassed levels set in 1988, the deadliest floods the country has ever faced.

Faller added that more than one third of Bangladesh and Nepal have been flooded. "We fear the humanitarian crisis had get worse in the days and weeks ahead," he said.

"This tragic flooding in Nepal has claimed at least 128 lives and 33 people were still missing," said Dev Ratna Dhakhwa, Secretary General, Nepal Red Cross Society.

Floods in Bangladesh were likely to get much worse there as swollen rivers from India pour into the low-lying and densely populated areas in the north and center of the country.

The water levels of the Brahmaputra and its tributaries have gone down but 11 more deaths in Assam took the flood toll since the start of the monsoon season to 150 on Friday, August 18. Rail connectivity between the Northeast and the rest of India remained cut for the seventh consecutive day, The Indian Express reports.

Of the 150 deaths so far, 60 have occurred in the second wave of floods that began on August 10. Of the 60 deaths in the second wave, 12 were reported from Morigaon, nine each in Kokrajhar and Dhubri and seven in Bongaigaon.

As of August 18, the death toll in Bihar floods, triggered by rains in Nepal and northern parts of the state, rose to 153. 9.8 million people there have been affected.

Monsoon floods hit this region every year, but This one had been particularly severe.

Featured image: Severe monsoon floods in Assam, India - August 2017

➢ **December……**

EVENT: 400 000 affected, 5 killed in southern Thailand floods, December 2017

Annual monsoon rains were causing heavy floods in parts of southern Thailand since November 25. Nearly 400 000 people were affected and at least 5 killed, authorities said. A number of provinces have declared Disaster zones in various districts. The worst affected was the country's deep south. In Nakhon Si Thammarat, officials of Khao Luang National Park in Phrom Khiri district have temporarily closed access to Phrom Lok Waterfall, Ai Khiao Waterfall and three other waterfalls under their jurisdiction, following heavy runoff in the park, the government said. The officials urged nearby residents to beware of flash floods.

The province has declared Disaster zones in seven districts: Cha-uat, Bang Khan, Chian Yai, Chulabhorn, Phipun, Thung Song and Pak Phanang. Officials have been dispatched to distribute animal feed to agriculturalists who were struggling to provide for their livestock.

The Nakhon Si Thammarat provincial administration has also set up an emergency flood response center to coordinate relief from various sectors. Local residents were urged to closely follow the latest information from the center.

Similarly, in Songkhla, the province has estabilished an emergency flood response center in Thepa district, after the Thepa Canal overflowed into the surrounding community.

At least 5 people (2 in Songkhla, 2 in Pattani 2 and 1 in Yala) have been killed and more than 385 000 were affected. All 5 victims drowned.

Neighboring Malaysia had been affected by heavy rain and flooding during the same period, too. At least 2 people have died there and 13 000 were forced to evacuate.

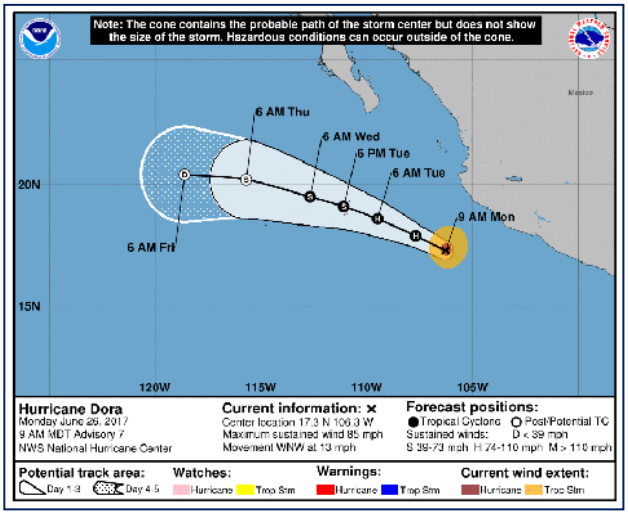
Featured image credit: CH3 Thailand

Hurricanes

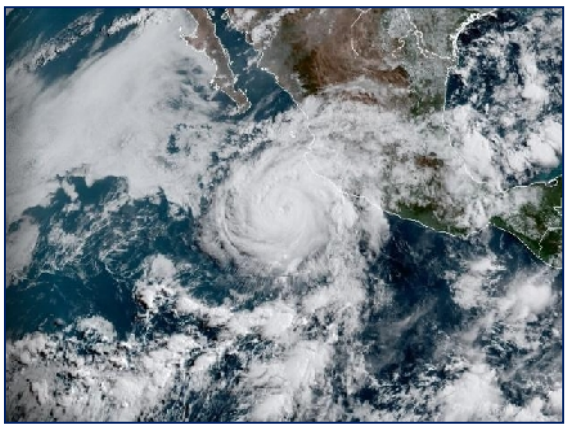
Category: Natural

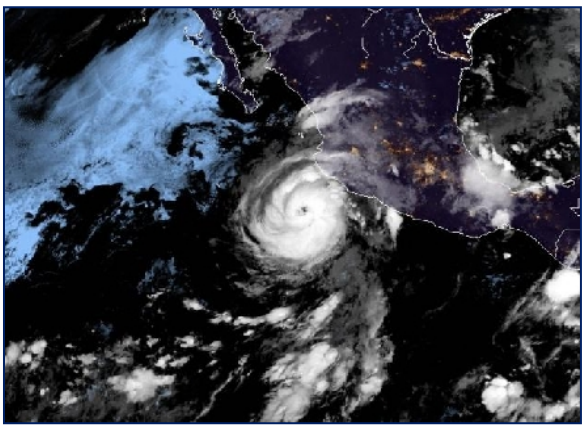
- **June…….**

EVENT: Hurricane "Dora" forms, first hurricane of the 2017 Pacific hurricane season, June 2017



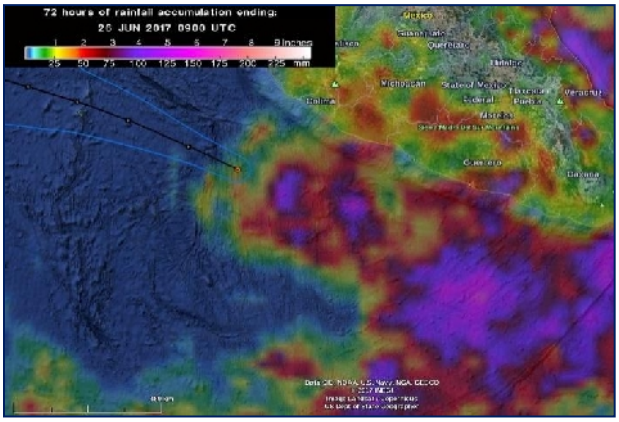
Tropical Storm "Dora" continued strengthening near the southwestern coast of Mexico after forming early June 25, 2017 and by 09:00 UTC on June 26 became a hurricane, the first of the 2017 Pacific hurricane season. Landfall was not expected and there were no coastal watches or warnings in effect, but life-threatening swells were expected to spread northwestward and begin affecting portions of the coast of southern Baja California peninsula on Tuesday, June 27.At 09:00 UTC on June 26 (04:00 CDT), the eye of Hurricane "Dora" was located 275 km (170 miles) SSW of Manzanillo and 415 km (255 miles) S of Cabo Corrientes, Mexico. The system was moving toward the west-northwest near 20 km/h (13 mph) with maximum sustained winds of 130 km/h (80 mph). This general motion with some decrease in forwarding speed was expected over the next 48 hours. Dora's minimum estimated central pressure at the time was 989 hPa.





Hurricane "Dora" at 14:45 UTC on June 26, 2017. GOES-16 Preliminary Non-Operational Data. Credit: CIRA / RAMMB

Dora was expected to produced rain accumulation 25 to 51 mm (of 1 to 2 inches) along coastal sections of the Mexican states of Guerrero and Michoacan.



Hurricane Dora - 72 hours of rainfall accumulation by 09:00 UTC on June 26, 2017. Credit: NASA/JAXA GPM, Google

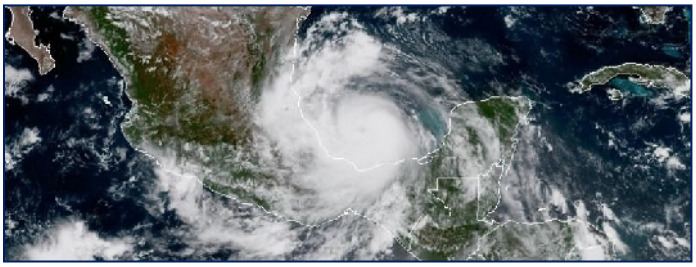
Swells generated by Dora were affecting portions of the coast of southwest Mexico. These swells were expected to spread northwestward and begin affecting portions of the coast of the southern Baja California peninsula. They were likely to caused life-threatening surf and rip current conditions.

Dora becomes a hurricane - June 25, 2017. Credit: NOAA / GOES-16, CIRA / RAMMB

Dora was the first hurricane of the 2017 Pacific hurricane season and the strongest northern hemisphere tropical cyclone of the 2017 season so far.

➢ **August…….**

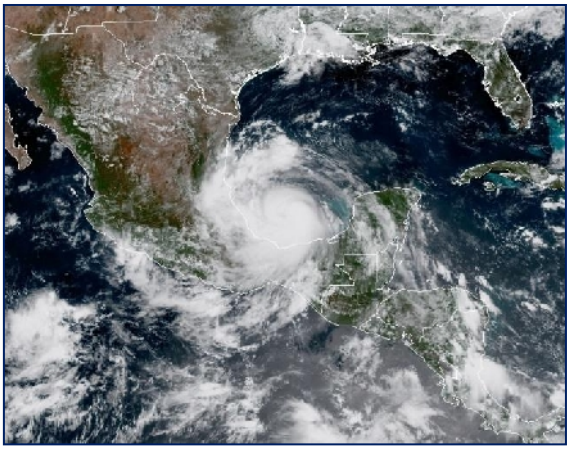
EVENT: Franklin, the first hurricane of the 2017 Atlantic season was about to hit Veracruz, August 2017



At 21:00 UTC on August 9, 2017, Franklin became the first hurricane of the 2017 Atlantic hurricane season. The system had hit the Mexican state of Veracruz (CDT) or early Thursday, August 10. Heavy rains brought by This storm were capable of producing life-threatening flash floods and mudslides. A dangerous storm surge raised water levels by as much as 1.2 to 1.8 m (4 to 6 feet) above normal tide levels. The center of Hurricane "Franklin" was located 170 km (105 miles) NE of Veracruz and 280 km (175 miles) ESE of Tuxpan, Mexico, according to the NHC. The system was moving west at 19 km/h (12 mph) with maximum sustained winds of 120 km/h (75 mph) and minimum central pressure of 984 hPa. Some additional strengthening was expected until the center crosses the coast, followed by rapid weakening.

A Hurricane Warning was in effect for the coast of Mexico from Puerto de Veracruz to Cabo Rojo. A Hurricane Watch was in effect north of Cabo Rojo to Rio Panuco. A Tropical Storm Warning was in effect for the coast of Mexico east of Puerto de Veracruz to Puerto Dos Bocas and north of Tuxpan to Barra del Tordo.

Hurricane-force winds extend outward up to 55 km (35 miles) from the center and tropical-storm-force winds extend outward up to 220 km (140 miles).



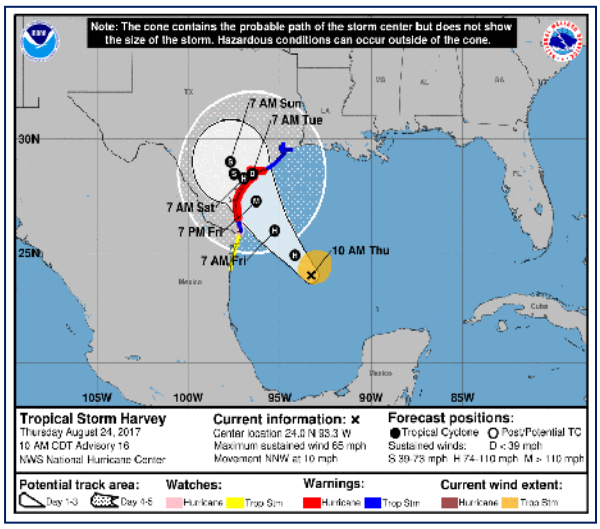
Tropical Storm Franklin at 17:55 UTC on August 9, 2017. Credit: NOAA/GOES-16, RAMMB/CIRA (Preliminary and non-operational)

Rainfall totals of 101.6 to 203.2 mm (4 to 8 inches) with isolated maximum amounts of 381 mm (15 inches) across the Mexican states of Tabasco, northern Veracruz, northern Puebla, Tlaxacala, Hidalgo, Queretar and eastern San Luis Potosi in eastern Mexico. These rains were capable of producing life-threatening flash floods and mudslides.

A dangerous storm surge raised water levels by as much as 1.2 to 1.8 m (4 to 6 feet) above normal tide levels along the immediate coast near and to the north of where the center made landfall in the Hurricane Warning area. Near the coast, the surge had been accompanied by large and destructive waves. While still a tropical storm, Franklin passed over the Yucatan peninsula, Mexico, causing serious flooding.

EVENT: Harvey rapidly strengthened into a hurricane, August 2017

Tropical Storm "Harvey" rapidly strengthened into a hurricane expected to become a major, Category 3 hurricane before it made landfall over the coast of Texas August 25 or 26, 2017. Preparations for the arrival of This extremely dangerous was well underway.



Harvey as expected to stall near the middle Texas coast dumping very heavy rain and causing life-threatening flooding. The combination of a dangerous storm surge and the tide caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. Life threatening swells generated by This storm affected Texas, Louisiana and northeast Mexico coast by Friday. At 17:00 UTC (12:00 CDT) on August 24, 2017, the center of Hurricane "Harvey" was located about 550 km (340 miles) SE of Corpus Christi and 540 km (335 miles) SSE of Port O'Connor, Texas.

Harvey's maximum sustained winds were reaching 100 km/h (65 mph) at 15:00 UTC. However, by they increased to 130 km/h (80 mph), making Harvey a Category 1 hurricane on the Saffir-Simpson scale. The system was moving NNW at 17 km/h (10 mph) with an estimated minimum central pressure of 981 hPa. Harvey as expected to produced total rain accumulations of 305 to 508 mm (12 to 20 inches) and isolated maximum amounts of 762 mm (30 inches) over the middle and upper Texas coast.

During the same time period, Harvey produced total rain accumulations of 127 to 305 mm (5 to 12 inches) in far south Texas and the Texas Hill Country to central Louisiana, with accumulations of less than 127 mm (5 inches) extending into other parts of Texas and the lower Mississippi Valley .Rainfall from Harvey caused life-threatening flooding.

The combination of a dangerous storm surge and the tide caused normally dry areas near the coast to be flooded by raising waters

The deepest water occurred along the immediate coast near and to the northeast of the landfall location, where the surge was accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

Category 4 Hurricane "Harvey" made landfall around 03:00 UTC on Saturday, August 26, 2017 at Rockport, Texas with winds of 215 km/h (130 mph). It then stalled over the coast of central Texas, dumping extreme amounts of rain. Harvey was the first major hurricane to make landfall in the United States since Wilma in 2005, ending a record 12-year period with no major hurricanes making landfall in the US. In terms of rainfall it brought and flooding it caused, experts say Texas has never seen an event like This, adding that it could become the worst flooding Disaster in the history of United States. Harvey was also the first hurricane to hit the state of Texas since Ike in 2008, and the strongest to hit the state since Carla in 1961. The system had weakened into a tropical storm, but dumped extremely heavy rain..

Tropical Storm "Harvey" formed on August 17 and moved swiftly westward into the Caribbean Sea under the influence of an expansive ridge of high pressure to its north. It was downgraded to a tropical depression at 21:00 UTC on August 19, and six hours later, it was declared an open tropical

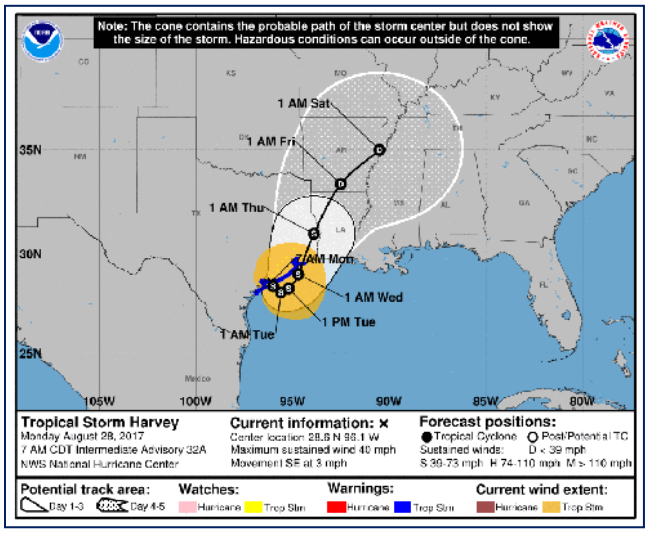
wave. A reconnaissance aircraft investigating its remnants at 15:00 UTC on August 23 indicated that it once again acquired a well-defined center, and the NHC upgraded it to a tropical depression accordingly. The system began to slowly consolidate amid an increasingly favorable environment, attaining tropical storm intensity by 06:00 UTC on August 24.

Further deepening occurred as the storm approached the coast of Texas, with Harvey becoming a Category 4 hurricane at 23:00 UTC on August 25, based on reconnaissance aircraft data. Around 03:00 UTC on Saturday, August 26, the hurricane made landfall at peak intensity over the northern end of San Jose Island, about 6 km (4 miles) east of Rockport with winds of 215 km/h (130 mph) and an atmospheric pressure of 938 hPa. Harvey became the first major hurricane to make landfall in the United States since Wilma in 2005 and the strongest in terms of wind speed to hit the country since Charley in 2004. It was the first hurricane to strike Texas since Ike in 2008, the first major hurricane in the state since Bret in 1999, and the strongest in Texas since Carla in 1961.

In Houston metro area, days of heavy rain caused unprecedented and catastrophic flooding, with parts of southeast Houston recording more than 610 mm (2 feet) of rain in just 24 hours. Houston Mayor Sylvester Turner said that as of 17:00 local time Sunday, August 27, the city received nearly 6 000 calls for rescues and that more than 1 000 have been rescued. As of early August 28, at least 5 persons lost their lives, but flooding was still not over as Harvey was expected to move slightly off the coast and make another landfall on Wednesday, August 30.

""A record daily max rainfall of 408.17 mm (16.07 inches) was set at Houston Intercontinental yesterday, breaking the old record of 211.32 mm (8.32 inches) set in 1945," the office said, adding that from January 1, 2017 to August 27, 2017, Houston IAH received 1 172.46 mm (46.16 inches). Since annual average rainfall was 1 264.15 (49.77 inches), that made almost a year of rain in just 3 months. For comparison, the most rain from an Atlantic tropical cyclone or its remnants was 1 219 mm (48 inches) from Tropical Storm "Amelia" in 1978.

Meteorologists say the flooding in Houston in some locations rivals what was observed during Tropical Storm "Alison" in 2001, one of the most devastating rain events in the history of the United States. Neither historical data nor weather forecasts could adequately predict This extraordinary storm that, before leaving Texas, would dump as much as 80 percent of the area's average annual rainfall over some Houston and Harris County neighborhoods, simultaneously affecting more than 2 million people. When the local rains finally eased, Allison had left Harris County, with 22 fatalities, 95 000 damaged automobiles and trucks, 73 000 damaged residences, 30 000 residents in shelters, and more than $5 billion in property damage in its wake.



Dr. Greg Postel, meteorologist and hurricane for The Weather Channel, said the flooding unfolding in the Houston area "could be the worst flooding Disaster in U.S. history;" and Gov. Abbott, appearing on Fox News Sunday, said: "We're measuring rain these days not in inches but in feet."

Swollen rivers in east Texas weren't expected to crest until later This week, CNN reports, but federal officials were already predicting the system haddrive 30 000 people into shelters and spur 450 000 victims to seek some sort of Disaster assistance

"This was a landmark event for Texas," said FEMA Adminwastrator Brock Long. "Texas has never seen an event like This." But, Long warned, Harvey presents a dynamic situation, and "every number we put out right was going to change in 30 minutes."

Harvey hadlikely surpass 2008's Hurricane "Ike" and 2001's Tropical Storm "Allwason," two of the most destructive storms to hit the Gulf coast in recent memory, he said. Around 13 million people from Corpus Chrwasti to New Orleans were under flood watches and warnings as of Monday morning as Harvey's storm bands repeatedly pummel the same areas.

At 12:00 UTC (07:00 CDT) on August 28, the center of Tropical Storm "Harvey" was located about 40 km (25 miles) east of Port O'Connor, Texas. Harvey was moving toward the southeast near 6 km/h (3 mph) with the minimum estimated central pressure of 997 hPa. A slow southeastward motion was expected and a slow northeastward motion was expected to begin on Tuesday. The center of Harvey was emerging off of the middle Texas coast, and it was expected to remain just offshore through Tuesday, August 29.

Maximum sustained winds, at the time, were near 65 km/h (40 mph)) with higher gusts. Slight restrengthening was possible later and Tuesday.

Featured image: Catastrophic flooding hits Houston, Texas - August 2017. Credit: Live Storms Media

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- **September…….**

EVENT: Extremely dangerous Category 5 Hurricane "Irma" closing in on Leeward Islands, September 2017

Irma was expected to produce total rainfall accumulations of 101.6 to 203.2 mm (4 to 8 inches) with isolated maximum amounts of 304. 8 mm (12 inches) across the northern Leeward Islands, the British and U.S. Virgin Islands, and Puerto Rico. These rainfall amounts may caused life-threatening flash floods and mudslides.

Swells generated by Irma affected the northern Leeward Islands, Puerto Rico, and the U.S. and British Virgin Islands. These swells caused life-threatening surf and rip current conditions.

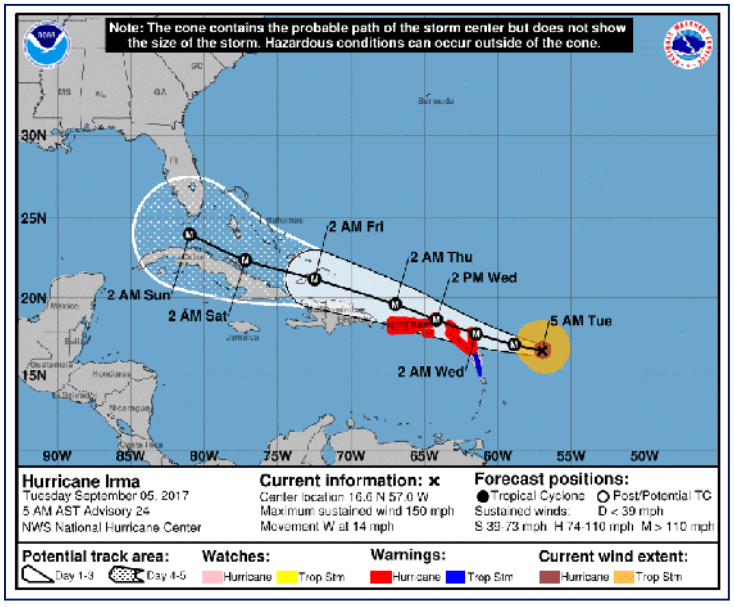
The strongest hurricane on record in satellite era (since 1966) to hit Leeward Islands was Hurricane "David" of 1979 at 257 km/h (160 mph) -> Irma was at 280 km/h (175 mph). David was an extremely deadly hurricane which caused massive devastation and loss of life in the Dominican Republic in August of 1979.

A Cape Verde-type hurricane that reached Category 5 hurricane status on the Saffir-Simpson Hurricane Scale, David was the fourth named tropical cyclone, second hurricane, and first major

hurricane of the 1979 Atlantic hurricane season, traversing through the Leeward Islands, Greater Antilles, and East Coast of the United States during late August and early September. David was believed to have been responsible for 2 068 deaths, making it one of the deadliest hurricanes of the modern era. It caused torrential damage across its path, most of which occurred in the Dominican Republic where the hurricane made landfall as a Category 5 hurricane.

As of 11:45 UTC (07:45 AST) on September 5, 2017, the distinct eye of Hurricane "Irma" was located 440 km (270 miles) E of Antigua and 445 km (280 miles) ESE of Barbuda. Its maximum sustained winds were reaching 280 km/h (175 mph). Irma was moving W at 22 km/h (14 mph) with a minimum estimated central pressure of 929 hPa.

This general motion was expected to continued , followed by a turn toward the west-northwest . On the current NHC forecast track, the core of Hurricane "Irma" had moved near or over portions of the northern Leeward Islands and early Wednesday, September 5 and 6.



A Hurricane Warning was in effect for:

Antigua, Barbuda, Anguilla, Montserrat, St. Kitts, and Nevwas

Saba, St. Eustatius, and Sint Maarten

Saint Martin and Saint Barthelemy

British Virgin Islands

U.S. Virgin Islands

Puerto Rico, Vieques, and Culebra

A Hurricane Warning means that hurricane conditions were expected somewhere within the warning area. A warning was typically issued 36 hours before the anticipated first occurredrence of tropical-storm-force winds, conditions that make outside preparations difficult or dangerous. In This case, for some of the easternmost islands, the hurricane conditions were expected within the next 24 hours.

Preparations to protect life and property should be rushed to completion.

A Hurricane Watch was in effect for:

Guadeloupe

Dominican Republic from Cabo Engano to the northern border with Haiti

A Tropical Storm Warning was in effect for:

Guadeloupe

Dominica

A Tropical Storm Warning means that tropical storm conditions were expected somewhere within the warning were in thaws case within 36 hours. Interests in the Dominican Republic, Haiti, the Turks and Caicos islands, Cuba, and the southeastern and central Bahamas should monitor the progress of Irma.

A Tropical Storm Watch was in effect for:

Dominican Republic from south of Cabo Engao to Wasla Saona

A Tropical Storm Watch means that tropical storm conditions were possible within the watch area, generally within 48 hours.

Hurricane conditions were expected within the hurricane warning area by with tropical storm conditions beginning later.

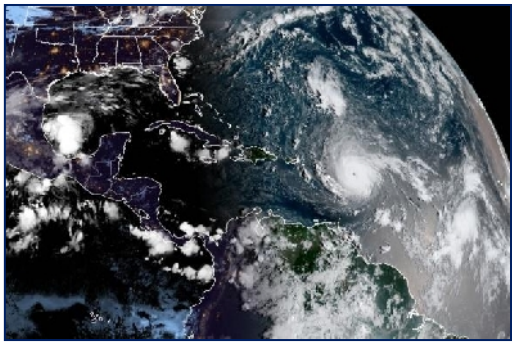
Tropical storm conditions were expected within the tropical storm warning area where hurricane conditions were also possible.

Hazards affecting land

The combination of a dangerous storm surge and large breaking waves such as water levels by as much as 6 to 9 feet above normal tide levels along the coasts of the extreme northern Leeward Islands within the hurricane warning area near and to the north of the center of Irma. Near the coast, the surge had been accompanied by large and destructive waves. The combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. The water was expected to reach the following heights above ground if the peak surge occurreds at the time of high tide:

British and U.S. Virgin islands except St. Croix: 1.2 to 1.8 m (4 to 6 feet) Northern coast of Puerto Rico: 0.6 to 1.2 m (2 to 4 feet) Southern coast of Puerto Rico and St. Croix: 0.3 to 0.6 m (1 to 2 feet) The deepest water had occurred along the immediate coast in areas of onshore winds, where the surge had been accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

Irma was expected to produce total rainfall accumulations of 101.6 to 203.2 mm (4 to 8 inches) with isolated maximum amounts of 304. 8 mm (12 inches) across the northern Leeward Islands, the British and U.S. Virgin Islands, and Puerto Rico. These rainfall amounts may caused life-threatening flash floods and mudslides.



Swells generated by Irma affected the northern Leeward Islands, Puerto Rico, and the U.S. and British Virgin Islands during the next several days. These swells were likely to caused life-threatening surf and rip current conditions.

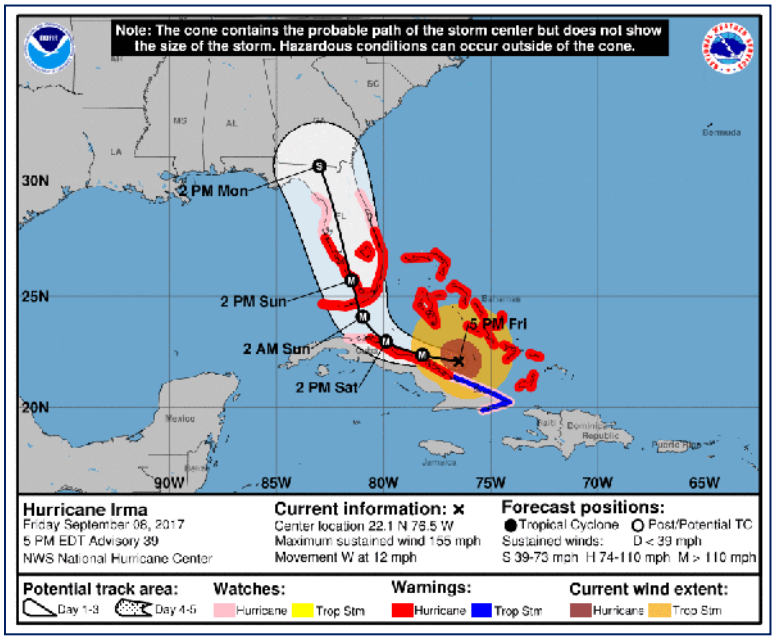
Category 5 Hurricane "Irma" at 11:30 UTC on September 5, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

According to Dr. Philip Klotzbach, meteorologist at CSU specializing in Atlantic basin seasonal hurricane forecasts, Irma was the 17th hurricane in the Antlantic to have maximum winds >= 280 km/h (175 mph). Atlantic Ocean's maximum wind record was held by Hurricane "Alen" of 1980 at 306 km/h (190 mph). Irma was the strongest Atlantic Ocean hurricane since Felix in 2007.

As of September 5, Irma had been major hurricane for 3.5 days, trailing only Luis (1995) for Category 3+ hurricane days by TC in the tropical Atlantic (<20N, 20-60W) on record. Irma was also the furthest east in Atlantic that we've had a 280 km/h (175 mph) hurricane on record (57.7°W). The previous record was held by David (1979) - (66.2°W). The strongest hurricane on record in satellite era (since 1966) to hit Leeward Islands was David (1979) at 257 km/h (160 mph). In satellite era, only 3 hurricanes have hit Leeward Islands at >= 241 km/h (150 mph).

Featured image: Category 5 Hurricane "Irma" at 11:30 UTC on September 5, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

Hurricane "Irma" changed its projected path and its latest forecast track takes it over or very near the coast of northern Cuba. On the current forecast track, Irma hadstart moving away from Cuba around 18:00 UTC on Saturday, September 9 and make a turn toward Florida. Hurricane conditions were already spreading westward over portions of Cuba and the central Bahamas. Hurricane Warnings were extended northward along the Florida Peninsula.After devastating everything in its path, Category 4 Hurricane "Irma" was passing just north of eastern Cuba and, according to the latest forecast track, its deadly center was expected to pass directly over or very near the Jardines del Rey archipelago in northern Cuba.



Landfall was possible over the Cayo Romano island, in the province of Camagüey, before 12:00 UTC on Saturday, September 9. If it stays on This course, Irma hadpass through the island of Cayo Coco, kn for its all-inclusive resorts, and continued toward Cayo Santa Maria, Cayo Fragoso, and Cayos del Pajonal before making a turn toward Florida, United States, late Saturday (UTC) and early Sunday, September 10.

At 21:00 UTC on September 8, 2017, the center of Hurricane "Irma" was located about 310 km (195 miles) E of Caibarien, Cuba and 555 km (345 miles) SE of Miami, Florida. Its maximum sustained winds were 250 km/h (155 mph), making Irma a Category 4 hurricane on the Saffir-Simpson Hurricane Wind Scale.

Irma was moving west at 19 km/h (12 mph) with a minimum central pressure of 925 hPa and was expected to be near the Florida Keys and the southern Florida Peninsula Sunday morning (EDT).

Some fluctuations in intensity were likely to continued during the next day or two, and Irma was expected to remain a powerful Category 4 hurricane as it approaches Florida.

Hurricane-force winds extend outward up to 110 km (70 miles) from the center and tropical-storm-force winds extend outward up to 295 km (185 miles).

A Storm Surge Warning was in effect for:

Sebastian Inlet southward around the Florida peninsula to Venice

Florida Keys

A Storm Surge Warning means there was a danger of life-threatening inundation, from raising water moving inland from the coastline, during the next 36 hours in the indicated locations. This was a life-threatening situation. Persons located within these areas should take all necessary actions to protect life and property from raising water and the potential for other dangerous conditions. Promptly follow evacuation and other instructions from local officials.

A Storm Surge Watch was in effect for:

North of Sebastian Inlet to the Flagler/Volusia County line

North of Venice to Anclote River

Tampa Bay

A Storm Surge Watch means there was a possibility of life-threatening inundation, from raising water moving inland from the coastline, in the indicated locations during the next 48 hours.

A Hurricane Warning was in effect for:

Sebastian Inlet southward around the Florida peninsula to Anna Maria Island

Florida Keys

Lake Okeechobee

Florida Bay

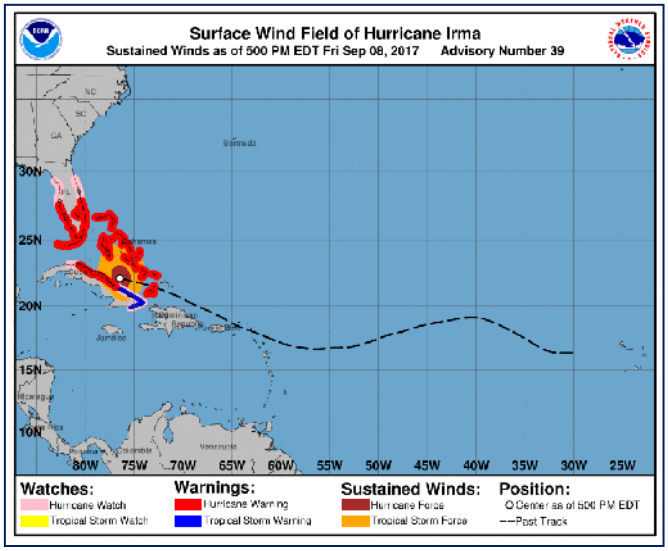
Southeastern Bahamas

Cuban provinces of Camaguey, Ciego de Avila, Sancti Spiritus, and Villa Clara

Central Bahamas

Northwestern Bahamas

A Hurricane Watch was in effect for:



North of Sebastian Inlet to the Flagler/Volusia County Line

North of Anna Maria Island to the Suwannee River

Cuban provinces of Guantanamo, Holguin, Las Tunas and Matanzas

A Hurricane Watch means that hurricane conditions were possible within the watch area. A watch was typically issued 48 hours before the anticipated first occurredrence of tropical-storm-force winds, conditions that make outside preparations difficult or dangerous.

A Tropical Storm Warning was in effect for:

Cuban provinces of Guantanamo, Holguin, and Las Tunas

Hazards affecting land

The combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. The water was expected to reach the following HEIGHTS ABOVE GROUND if the peak surge occurreds at the time of high tide:

SW Florida from Captiva to Cape Sable: 2.4 to 3.6 m (8 to 12 feet)

Cape Sable to Boca Raton including the Florida Key: 1.5 to 3 m (5 to 10 feet)

Venice to Captiva: 1.5 to 2.4 m (5 to 8 feet)

Anclote River to Venice including Tampa Bay: 0.9 to 1.5 m (3 to 5 feet)

Boca Raton to Flagler/Volusia County line: 0.9 to 1.8 m (3 to 6 feet)

The deepest water had occurred along the immediate coast in areas of onshore winds, where the surge had been accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

The combination of a life-threatening storm surge and large breaking waves had raised water levels ABOVE NORMAL TIDE LEVELS by the following amounts within the hurricane warning area near and to the north of the center of Irma. Near the coast, the surge had been accompanied by large and destructive waves.

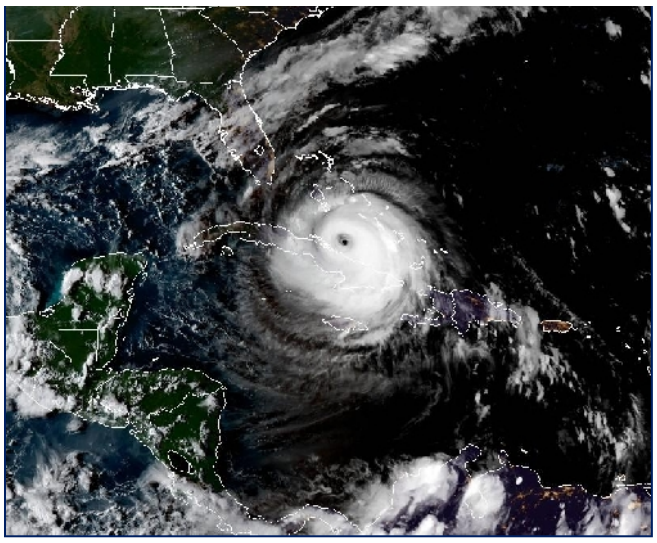
Southeastern and central Bahamas: 4.5 to 6 m (15 to 20 feet)

Northwestern Bahamas: 1.5 to 3 m (5 to 10 feet)

Northern coast of Cuba in the warning area: 1.5 to 3 m (5 to 10 feet)

Hurricane conditions were still occurredring in portions of the southeastern and Central Bahamas. Hurricane conditions were expected to continued within the hurricane warning area along the north coast of Cuba through Saturday. Hurricane conditions were expected in the northwestern Bahamas and Saturday, and in portions of southern and central Florida and the Florida Keys Saturday night or early Sunday (EDT).

Hurricane conditions were possible within the watch area in central and north Florida by Sunday, with tropical storm conditions possible by late Saturday.



Hurricane "Irma" at 22:45 UTC on September 8, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

Irma was expected to produce the following rain accumulations

Dominican Republic, Haiti, and Turks and Caicos: additional 25.4 to 76.2 mm (1 to 3 inches).

Southern Bahamas and northern Cuba: 254 to 381 mm (10 to 15 inches), isolated 508 mm (20 inches).

Southern Cuba: 101.6 to 203.2 mm (4 to 8 inches), isolated 304.8 (12 inches).

Jamaica: 25.4 to 50.8 mm (1 to 2 inches).

The Florida Keys, much of the Florida peninsula, and southeast Georgia: 203.2 to 381 mm (8 to 15 inches), isolated 508 mm (20 inches).

Western and Northern Florida peninsula from Tampa northward: 101.6 to 203.2 mm (4 to 8 inches), isolated 304.8 (12 inches).

Rest of Eastern Georgia, western South Carolina, and Western North Carolina: 101.6 to 177.8 mm (4 to 7 inches).

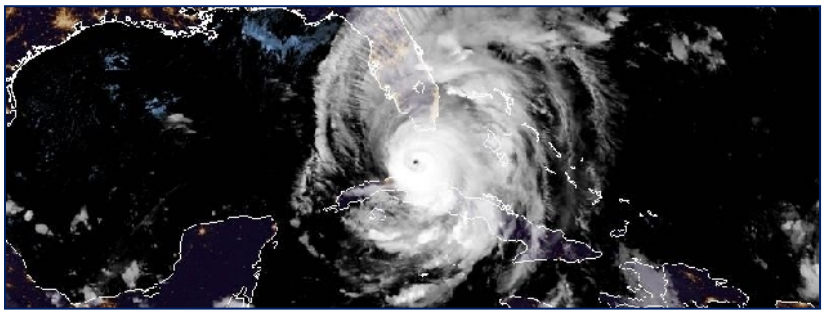
Western Georgia, eastern and northern Alabama, and southern Tennessee: 50.8 to 127 mm (2 to 5 inches).

In all areas This rainfall may caused life-threatening flash floods and, in some areas, mudslides.

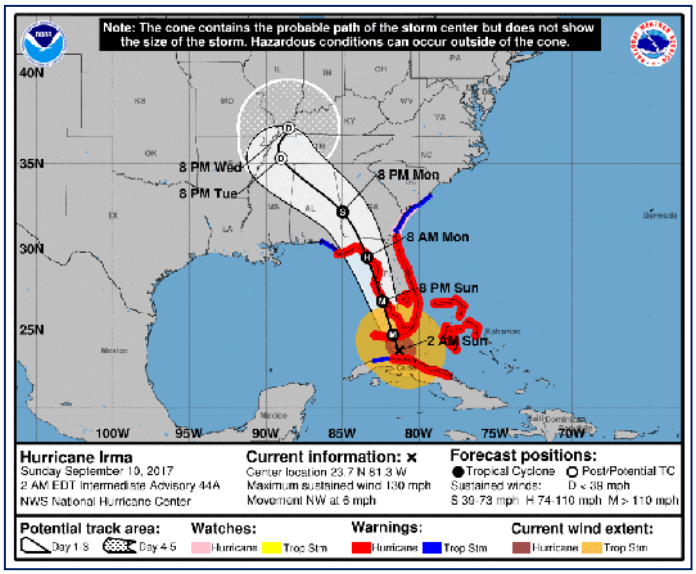
A few tornadoes had been possible beginning Saturday morning across south Florida.

Swells generated by Irma were affecting the southeastern Bahamas, the Turks and Caicos Islands, the northern coast of the Dominican Republic, and should start affecting portions of the southeast coast of the United States . These swells were likely to caused life-threatening surf and rip current conditions.

Featured image: Hurricane "Irma" at 22:45 UTC on September 8, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)



After striking northern Cuba on Saturday, September 9, 2017, Hurricane "Irma" turned toward Florida and regained Category 4 hurricane strength. This extremely dangerous hurricane made landfall at Cudjoe Key in lower Florida Keys at 13:10 UTC (09:10 EDT) on September 10, 2017 with maximum sustained winds of 215 km/h (130 mph).At 07:00 UTC (03:00 EDT) on September 10, 2017, the center of Hurricane "Irma" was located 105 km (65 miles) SE of Key West, Florida. The system has maximum sustained winds of 210 km/h (130 mph), making it a Category 4 hurricane on the Saffir-Simpson scale.



Irma's minimum central pressure was 930 hPa. This was the same pressure as Hurricane "Donna" of 1960 when it made landfall in southwest Florida 57 years ago and the same as the pressure at landfall for the Great Miami Hurricane of 1926.

Irma was moving slowly northwestward toward the lower Florida Keys near 9 km/h (6 mph). A turn toward the north-northwest with an increase in forward speed expected through late Monday.

Hurricane-force winds extend outward up to 110 km (70 miles) from the center, and tropical-storm-force winds extend outward up to 335 km (205 miles). A private anemometer at Marathon Key, Florida, recently reported a wind gust of 141 km/h (88 mph).

A Storm Surge Warning was in effect for:

South Santee River southward to Jupiter Inlet

North Miami Beach southward around the Florida peninsula to the Ochlockonee River

Florida Keys

Tampa Bay

A Storm Surge Warning means there was a danger of life-threatening inundation, from raising water moving inland from the coastline, during the next 36 hours in the indicated locations. This was a life-threatening situation. Persons located within these areas should take all necessary actions to protect life and property from raising water and the potential for other dangerous conditions. Promptly follow evacuation and other instructions from local officials.

A Hurricane Warning was in effect for:

Fernandina Beach southward around the Florida peninsula to Indian Pass

Florida Keys

Lake Okeechobee

Florida Bay

Cuban provinces of Ciego de Avila, Sancti Spiritus, Villa Clara, Matanzas, and La Habana

Andros Island, Bimini, and Grand Bahama

A Hurricane Warning means that hurricane conditions were expected somewhere within the warning area. Preparations to protect life and property should be rushed to completion.

A Hurricane Watch was in effect for:

North of Fernandina Beach to Edwasto Beach

A Hurricane Watch means that hurricane conditions were possible within the watch area. A watch was typically issued 48 hours before the anticipated first occurredrence of tropical-storm-force winds, conditions that make outside preparations difficult or dangerous.

A Tropical Storm Warning was in effect for:

West of Indian Pass to the Okaloosa/Walton County Line

North of Fernandina Beach to South Santee River

A Tropical Storm Warning means that tropical storm conditions were expected somewhere within the warning area.

Hurricane "Irma" radar imagery from 07:08 to 08:18 UTC on September 10, 2017

Hazards affecting land

Storm surge

The combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. The water was expected to reach the following HEIGHTS ABOVE GROUND if the peak surge occurreds at the time of high tide...

Cape Sable to Captiva: 3 to 4.6 m (10 to 15 feet)

Captiva to Ana Maria Island: 1.8 to 3 m (6 to 10 feet)

Card Sound Bridge through Cape Sable, including the Florida Keys: 1.5 to 3 m (5 to 10 feet)

Ana Maria Island to Clearwater Beach, including Tampa Bay: 1.5 to 2.4 (5 to 8 feet)

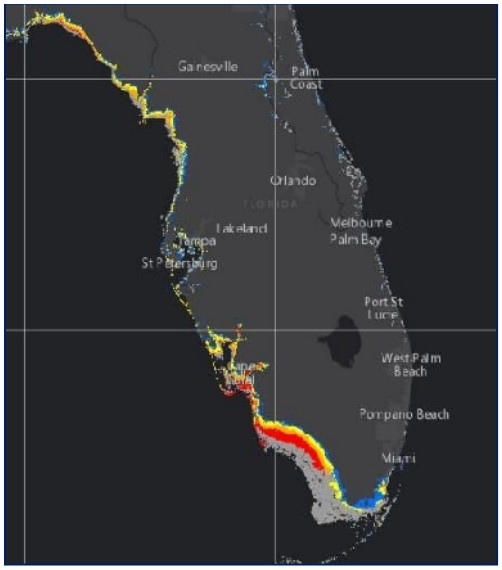
North Miami Beach to Card Sound Bridge, including Bwascayne Bay: 0.9 to 1.5 m (3 to 5 feet)

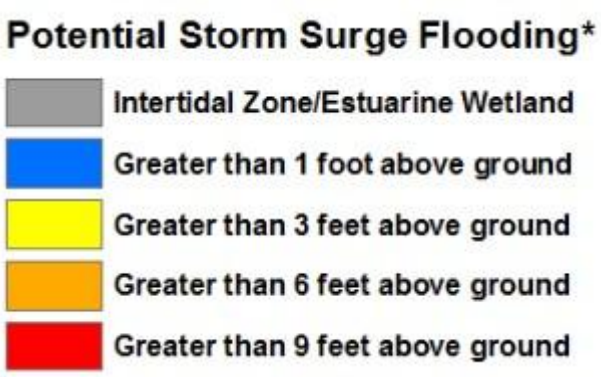
South Santee River to Fernandina Beach: 1.2 to 1.8 m (4 to 6 feet)

Clearwater Beach to Ochlockonee River: 1.2 to 1.8 m (4 to 6 feet)

Fernandina Beach to Jupiter Inlet: 0.6 to 1.2 m (2 to 4 feet)

North of North Miami Beach to Jupiter Inlet: 0.3 to 0.6 m (1 to 2 feet)





Displayed flooding values indicate the water height that has about a 1-in-10 (10%) chance of being exceeded.

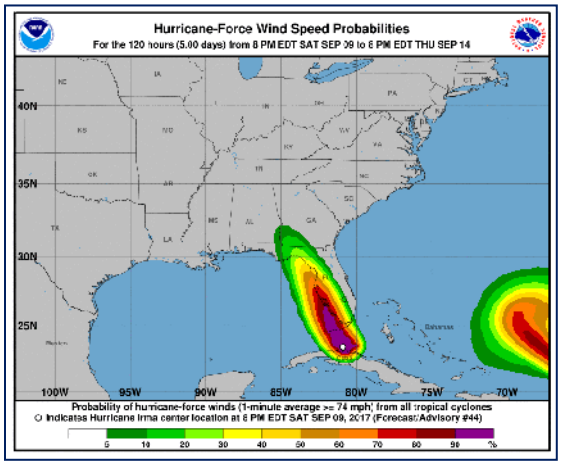
The deepest water had occurred along the immediate coast in areas of onshore winds, where the surge had been accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

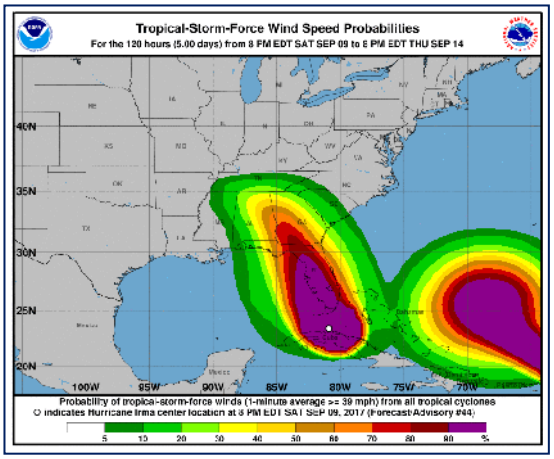
The combination of a life-threatening storm surge and large breaking waves had raised water levels ABOVE NORMAL TIDE LEVELS by the following amounts within the hurricane warning area near and to the north of the center of Irma. Near the coast, the surge had been accompanied by large and destructive waves.

- Northwestern Bahamas: 0.9 to 1.8 m (3 to 6 feet)
- Northern coast of Cuba in the warning area: 1.5 to 3 m (5 to 10 feet)

Wind

Hurricane conditions were expected to continued within the hurricane warning area along the north coast of Cuba through This morning. Hurricane conditions were expected in portions of the Florida peninsula and the Florida Keys beginning in the next several hours, and in the northwestern Bahamas for the next few hours. Tropical storm and hurricane conditions were expected to spread northward across the remainder of the warning areas through Monday.





Rainfall

Irma was expected to produce the following rain accumulations through Wednesday:

Northern Cuba: 254 to 381 mm (10 to 15 inches), isolated 508 mm (20 inches).

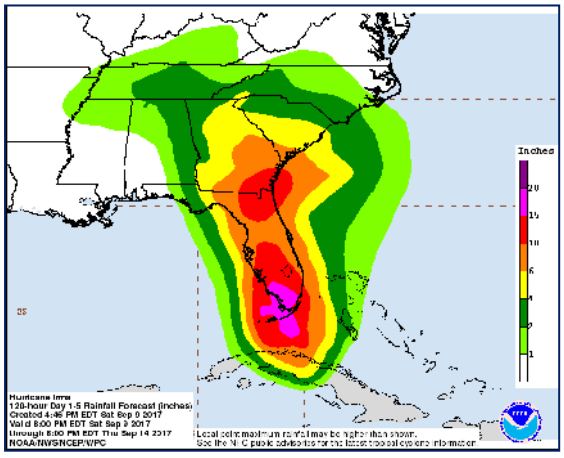
Southern Cuba: 127 to 254 mm (5 to 10 inches), isolated 381 mm (15 inches).

Western Bahamas: 76.2 to 152.4 mm (3 to 6 inches), isolated 254 mm (10 inches).

The Florida Keys: 254 to 508 mm (10 to 20 inches), isolated 635 mm (25 inches).

The Florida peninsula and southeast Georgia: 203.2 to 381 mm (8 to 15 inches), isolated 508 mm (20 inches).

The eastern Florida Panhandle and southern South Carolina: 101.6 to 203.2 mm (4 to 8 inches), isolated 254 mm (10 inches).



Rest of eastern Georgia, western South Carolina, and western North Carolina: 101.6 to 203.2 mm (4 to 8 inches).

Western Georgia, eastern and northern Alabama, and southern Tennessee: 50.8 to 127 mm (2 to 5 inches).

In all areas this rainfall may caused life-threatening flash floods and, in some areas, mudslides.

A few tornadoes were possible through Sunday night, mainly across southern, central, and eastern portions of the Florida peninsula.

The eye

Do not venture outside when the calm eye of the hurricane passes over, as dangerous winds hadreturn very quickly when the eye moves away.

Surf

Swells generated by Irma were affecting the southeast coast of the United States. These swells were likely to caused life-threatening surf and rip current conditions.

Hurricane Irma - Live coverage

There were numerous videos with live coverage out there. Below were just some of them, including live cameras.

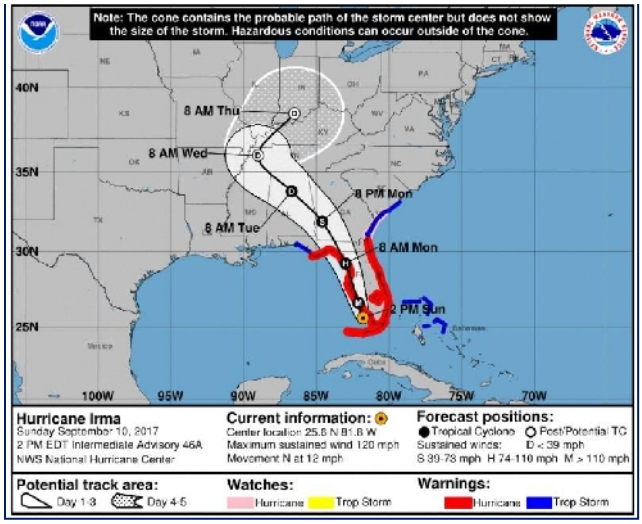
The eye of Hurricane "Irma" was 30 km (20 miles) ESE of Key West. Its maximum sustained winds were 215 km/h (130 mph).

More than 850 000 people in Florida were without power.

Irma made landfall at Cudjoe Key in Lower Florida Keys at 13:10 UTC (09:10 EDT), according to NHC.

The center of Hurricane "Irma" was located 30 km (20 miles) ENE of Key West, Florida. Its maximum sustained winds were 215 km/h (130 mph).

Irma was moving NNW at 13 km/h (8 mph) with the minimum estimated central pressure of 929 hPa.



Irma was impacting all of South Florida.

At least 3.5 million people across Florida were without power.

A historic warning - first-ever Tropical Storm Warning - was issued for Atlanta. Governor Nathan Deal has expanded an emergency declaration to include all 159 counties in Georgia.

The center of Hurricane "Irma" was located 30 km (20 miles) NW of Lakeland and 40 km (25 miles) NE of Tampa. Its maximum sustained winds, at 06:00 UTC, were 135 km/h (85 mph) and minimum central pressure 960 hPa.

Irma was moving NNW at 24 km/h (15 mph).

A turn toward the northwest at a faster forward speed was expected during the next day or so. On the forecast track, the center of Irma had continued to move over the western Florida peninsula through This morning and then into the southeastern United States late and Tuesday.

Irma weakened to a tropical storm but was still producing some wind gusts to near hurricane force.

Irma was blamed for the deaths of 7 people in the United States, 10 in Cuba, 11 in St Martin-St Maarten-St Barth, 1 in Anguilla and 4 in the British Virgin Islands.

Some 6.3 million people in Florida were without power and almost 1.3 million in Georgia.

September 12

Irma has degenerated into a remnant low.

It was blamed for the deaths of 22 people in the United States.

Featured image: Hurricane "Irma" at 05:00 UTC on September 10, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

EVENT: 10 people died in Cuba as a result of Hurricane "Irma", September 2017

The Cuban government announced Monday, September 11, 2017 that ten people have died in the country as a result of Hurricane "Irma." Seven people died in capital Havana, mainly as a result of building collapses.

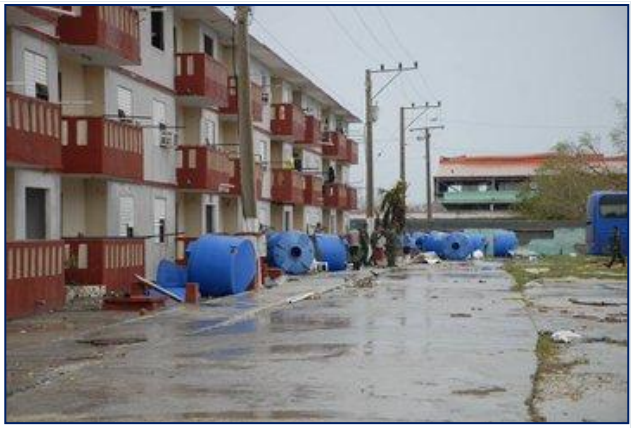
Category 4 Hurricane "Irma" approached Cuba late Friday, September 8 (UTC) and started moving over the country's northern coast with its southwestern eyewall around 00:00 UTC on Saturday, September 9

Irma made landfall on the Camaguey Archipelago, again as a destructive Category 5 hurricane, and continuedd moving near and over the northern coast of Cuba at a speed of 20 km/h (13 mph) with winds of 260 km/h (160 mph).

NOAA/GOES-16 imagery (preliminary and non-operational)

"The destructive force of Hurricane Irma lashed our island for more than 72 hours, from the morning of September 8 to Sunday, September 10," Granma.cu reported. "With winds that surpassed at times 250 km/h (155 mph), it crossed the north of the country from Baracoa to the vicinity of Cardenas. However, due to the immense size of the storm, no part of Cuba was freed from its effects."



Cuba suffered severe damage, but its full extent was still not kn. Preliminary reports mention damaged and destroyed houses and other infrastructure, electricity network and agriculture. In addition, Irma hit hard some of Cuba's main tourist destinations, but authorities say they hadall be rebuilt by the start of the high season.

Some 10 000 people have been evacuated from capital Havana ahead of the storm. However, at least 7 of 10 casualties were from the capital. Other victims were from Matanzas, Camagüey and Ciego de Ávila.

President Castro said the recovery task was immense but Cubans hadwin the battle.

Featured image: Jardines del Rey Airport, Cayo Coco, Cuba after the passage of Hurricane "Irma" - September 2017. Credit: Granma

Irma for the history books: Meteorological records and most notable facts

Irma was born as a tropical storm on August 30, 2017 and became a hurricane on August 31. It then rapidly intensified into Category 5 hurricane and passed over several Caribbean islands, destroying everything in its path. It made landfall over Cudjoe Key in the lower Florida on September 10 and degenerated into a remnant low on Tuesday, September 12. This hurricane was responsible for 22 lives in the United States, 10 in Cuba, 11 in St Martin-St Maarten-St Barth, 1 in Anguilla and 4 in the British Virgin Islands.Much had been said about This hurricane over the past couple of days, so This article only serves to archive Irma's meteorological records and most notable facts. The lwast was compiled by Dr. Philip Klotzbach, a meteorologist at CSU specializing in Atlantic basin seasonal hurricane forecasts. The source can be found, here.

Recap intensity/day measures

297.7 km/h (185 mph) lifetime max winds – tied with Florida Keys (1935), Gilbert (1988) and Wilma (2005) for second strongest max winds of all time in Atlantic hurricane. Allen had max winds of 305.7 km/h (190 mph) in 1980.

297.7 km/h (185 mph) mph lifetime max winds – the strongest storm to exwast in the Atlantic Ocean outside of the Caribbean and Gulf of Mexico on record.

297.7 km/h (185 mph) max winds for 37 hours – the longest any cyclone around the globe has maintained that intensity on record. The previous record was Haiyan in the NW Pacific at 24 hours.

914 hPa lifetime minimum central pressure – lowest in the Atlantic since Dean (2007) and 10th lowest in satellite era (since 1966).

914 hPa lifetime minimum central pressure – lowest pressure by an Atlantic hurricane outside of the western Caribbean and Gulf of Mexico on record.

First Category 5 hurricane in the Atlantic since Matthew (2016) and first Category 5 hurricane in the tropical Atlantic (7.5-20°N, 60-20°W) since Hugo (1989).

3.25 day lifetime as a Category 5 hurricane – tied with Cuba (1932) for longest lifetime as Category 5 in Atlantic.

3 consecutive days as a Category 5 hurricane – the longest for an Atlantic hurricane in the satellite era (since 1966).

12.75 named storm days – the most since Nicole (2016) and tied for 23rd most in satellite era for the Atlantic.

11.25 hurricane days – the most since Ivan (2004) and tied for 9th most in satellite era (since 1966) for the Atlantic – satellite-era record was Ginger (1971) with a whopping 19.5 hurricane days.

8.50 major hurricane days – the 2nd most in satellite era (since 1966) for the Atlantic – trailing Ivan (2004).

3.75 major hurricane days in the tropical Atlantic (7.5-20°N, 60-20°W) – trailing only Luis (1995) for major hurricane days in the tropical Atlantic.

ACE measures

Generated the most Accumulated Cyclone Energy by a tropical cyclone on record in the tropical Atlantic (7.5-20°N, 60-20°W).

Generated more Accumulated Cyclone Energy than the first eight named storms of the Atlantic hurricane season (Arlene-Harvey) combined.

Generated the most Atlantic Accumulated Cyclone Energy in a 24-hour period on record, breaking old record set by Allen (1980).

67.5 Accumulated Cyclone Energy – the 2nd most by an Atlantic hurricane in satellite era (since 1966) – trailing only Ivan (70.4).

Generated enough Accumulated Cyclone Energy to satwasfy NOAA ACE definition for an average Atlantic hurricane season.

Generated more Accumulated Cyclone Energy than 18 entire Atlantic hurricane seasons in the satellite era (since 1966).

Landfall records

Leeward Islands: Strongest storm on record to impact the Leeward Islands defined as 15-19°N, 65-60°W for This calculation, with max winds of 297.7 km/h (185 mph). Okeechobee Hurricane (1928) and David (1979) were previous strongest at 257 km/h (160 mph).

Turks and Caicos: Closest approach of a Category 5 hurricane on record.

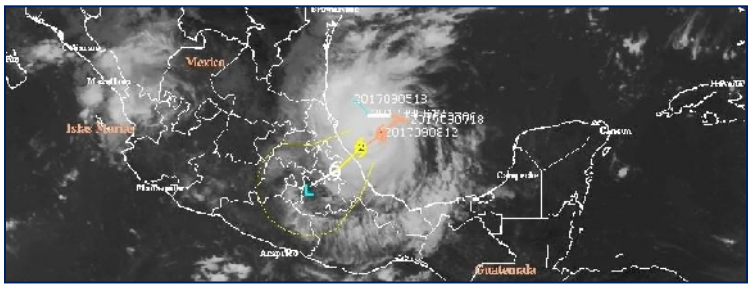
The Bahamas: First Category 5 hurricane to make landfall since Andrew (1992).

Cuba: 257 km/h (160 mph), 924 hPa – Category 5. First Category 5 hurricane to make landfall since the Cuba Hurricane of 1924.

Continental United States: 1st landfall (Cudjoe Key, FL): 209 km/h (130 mph), 929 hPa – Category 4. First Category 4 hurricane to make landfall in Florida since Charley (2004) and major hurricane to make landfall in Florida since Wilma (2005). 929 hPa pressure was tied for 7th lowest on record

for U.S. landfall with Lake Okeechobee Hurricane of 1928. 2nd landfall (Marco Island, FL): 185 km/h (115 mph), 940 hPa – Category 3 - Exact same latitude/longitude as well as same Saffir/Simpson Category at landfall as Wilma (2005): 25.9°N, 81.7°W.

EVENT: Katia dangerous Category 2 hurricane, crawling toward Mexico, September 2017



Category 2 Hurricane "Katia" was slowly moving toward the coast of eastern Mexico and was expected to make landfall near or at major hurricane strength early Saturday morning (CDT), September 9, 2017, somewhere between Nautla and Monte Gordo, Veracruz. A dangerous storm surge raised water levels by as much as 1.5 and 2.1 m (5 to 7 feet) above normal tide levels near and to the north of where Katia made landfall.

Katia was expected to produce total rain accumulations of 254 to 381 mm (10 to 15 inches) over northern Veracruz, eastern Hidalgo, and Puebla. Total rain accumulations of 50.8 to 127 mm (2 to 5 inches) over southern Tamaulipas, eastern San Luis Potosi, western Hidalgo, eastern Queretaro, and southern Veracruz through Saturday evening. Isolated maximum amounts of 635 mm (25 inches) were possible in northern Veracruz, eastern Hidalgo, Puebla, and San Luis Potosi. Rainfall had caused life-threatening flash floods and mudslides, especially in areas of mountainous terrain.

Swells generated by this hurricane had continued to affect portions of the coast of southeastern Mexico.

As of 18:00 UTC on September 8, 2017, the center of Hurricane "Katia" was located 220 km (135 miles) ESE of Tampico and 210 km (130 miles) NNE of Veracruz, Mexico.

The system has maximum sustained winds of 165 km/h (100 mph) and the minimum central pressure of 974 hPa. This places Katia on the upper edge of Category 2 hurricane on the Saffir-Simpson Hurricane Wind Scale.

Additional strengthening was forecast and Katia could be near or at major hurricane strength (Category 3) by the time of landfall. Category 3 hurricanes have maximum sustained winds between 178 - 208 km/h (111-129 mph).

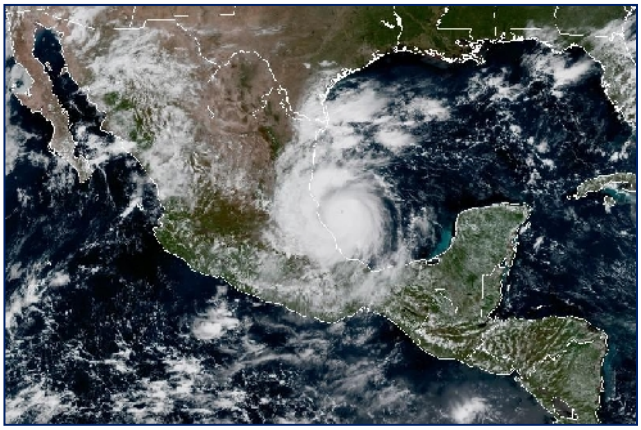
Katia has a minimum central pressure of 974 hPa and was moving WSW at a speed 9 km/h (5 mph). This general motion was expected to continued through landfall area early Saturday (CDT), September 9.

A Hurricane Warning was in effect for:

- Cabo Rojo to Laguna Verde

A Hurricane Warning means that hurricane conditions were expected somewhere within the warning area, in This case within 12 to 24 hours. Preparations to protect life and property should be rushed to completion.

A Tropical Storm Warning was in effect for:



- North of Cabo Rojo to Rio Panuco
- South of Laguna Verde to Puerto Veracruz

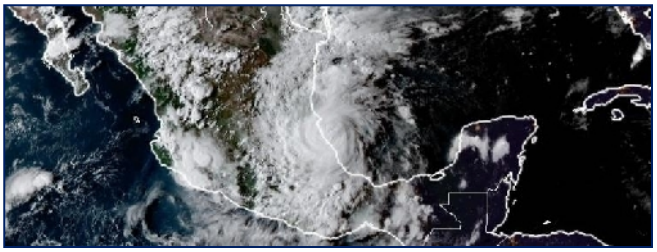
A Tropical Storm Warning means that tropical storm conditions were expected somewhere within the warning area, in This case within 24 hours.

Hurricane "Katia" at 17:30 UTC on September 8, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

Hazards affecting land

A dangerous storm surge had raised water levels by as much as 1.5 and 2.1 m (5 to 7 feet) above normal tide levels near and to the north of where Katia made landfall. Near the coast, the surge had been accompanied by large and destructive waves.

Katia was expected to produce total rain accumulations of 254 to 381 mm (10 to 15 inches) over northern Veracruz, eastern Hidalgo, and Puebla. Total rain accumulations of 50.8 to 127 mm (2 to 5 inches) over southern Tamaulipas, eastern San Luis Potosi, western Hidalgo, eastern Queretaro, and southern Veracruz through Saturday evening. Isolated maximum amounts of 635 mm (25 inches) were possible in northern Veracruz, eastern Hidalgo, Puebla, and San Luis Potosi. This rainfall had likely caused life-threatening flash floods and mudslides, especially in areas of mountainous terrain.Hurricane conditions were expected within portions of the hurricane warning area by or early Saturday, with tropical storm conditions expected within the tropical storm warning areas by later .



Swells generated by Katia had continued to affect portions of the coast of southeastern Mexico during the next couple of days.

Featured image: Hurricane "Katia" at 15:45 UTC on September 8, 2017 with forecast track. Credit: UW-CIMSS

Katia weakened to a tropical depression near Mexico's Sierra Madre Mountains around 12:00 UTC on September 9 after making landfall north of Tecolutla in the state of Veracruz around 03:00 UTC. Although Katia was Category 2 hurricane and still strengthening while approaching the coast of eastern Mexico, its maximum sustained winds at the time of landfall were 120 km/h (75 mph), placing Katia on the lower end of Category 1 hurricane. Its central pressure at the time of landfall was 988 hPa.Katia was downgraded to a tropical storm when it was about 185 km (115 miles) northwest of Veracruz with sustained winds of 65 km/h (40 mph).

However, the threat from This system was still not over as Katia was very slow-moving and dumping heavy rain on areas that have been saturated in recent weeks. Landslides and flooding had presented a serious threat.

Veracruz authorities urged people living below hills and slopes to be prepared to evacuate.

Hurricane "Katia" making landfall over Veracruz, Mexico - September 8 - 9, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

At 12:00 UTC , the center of what's left of Katia was located about 235 km (145 miles) south of Tampico and 185 km (115 miles) WNW of Veracruz. Maximum sustained winds were reaching 55 km/h (2 mph). The estimated minimum central pressure was 1004 hPa.

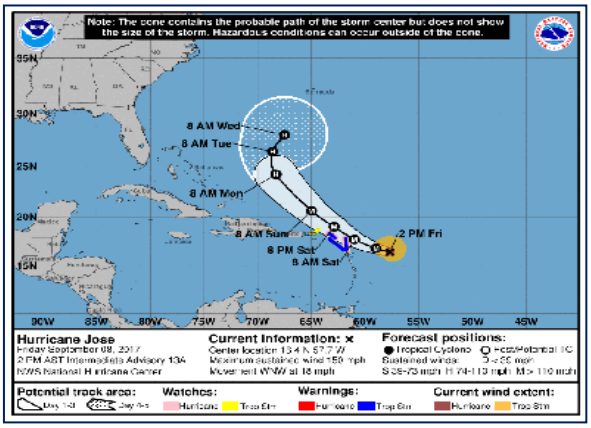
Tropical Depression "Katia" was crawling WSW at a speed of 4 km/h (2 mph) and was expected to continued drifting in that general direction until dissipation.

Katia was expected to produce total rain accumulations of 254 to 381 mm (10 to 15 inches) over northern Veracruz, eastern Hidalgo, and Puebla. Katia was also expected to produce total rain accumulations of 50.8 to 127 mm (2 to 5 inches) over southern Tamaulipas, eastern San Luis Potosi, western Hidalgo, eastern Queretaro, and southern Veracruz through Saturday evening. Isolated maximum amounts of 635 mm (25 inches) were possible in northern Veracruz, eastern Hidalgo, Puebla, and San Luis Potosi. This rainfall had likely caused life-threatening flash floods and mudslides, especially in areas of mountainous terrain.

Water levels along the coast should continued to decrease as the center dissipates and winds subside.

Swells generated by Katia had decreased along the coast of southeastern Mexico.

EVENT: Jose reaches Category 4 hurricane strength, following Irma toward Leeward Islands, September 2017

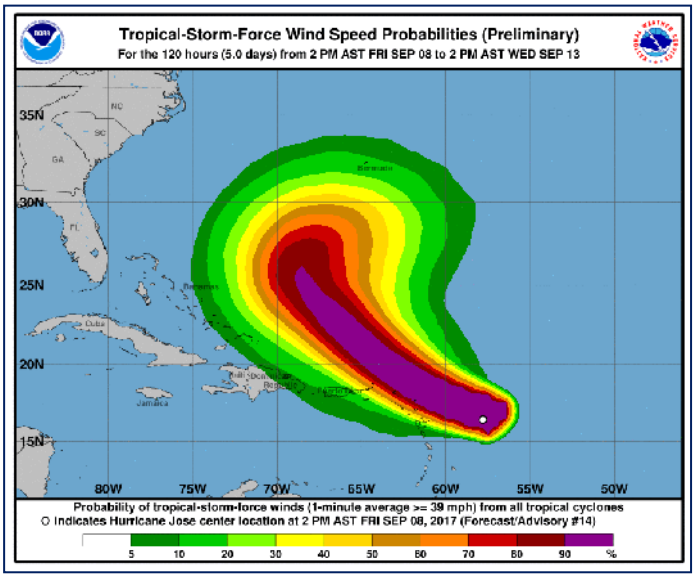


Tropical Storm "Jose" formed September 5, 2017 over the open waters of Atlantic Ocean as the 10th named tropical cyclone of the 2017 Atlantic hurricane season. Three days later, Jose was a powerful; Category 4 hurricane following almost the same path that devastating Hurricane "Irma" took while approaching the Leeward Islands. Heavy rainfall produced by this storm had maintained any ongoing flooding and may caused additional life-threatening flooding. In addition, Jose had brought powerful winds to already devastated islands and a

new round of life-threatening swells.

A Hurricane Warning was in effect for Barbuda and Anguilla, St Maarten, St. Martin and St. Barthelemy. Preparations to protect life and property should be rushed to completion. As of 21:00 UTC on September 8, the center of Hurricane "Jose" was located about 540 km (3335 miles) ESE of the northern Leeward Islands and had maximum sustained winds of 240 km/h (150 mph). This places Jose on the upper edge of Category 4 hurricane on the Saffir-Simpson scale.

Jose was moving toward the west-northwest near 28 km/h (17 mph) with a minimum central pressure of 940 hPa. A gradual turn toward the northwest with a decrease in forward speed was expected during the next 48 hours.



Some fluctuations in intensity were possible over the next day or so, and gradual weakening was expected after that.

Hurricanes* Katia, Irma *and* Jose *at 20:15 UTC on September 8, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

A Hurricane Warning was in effect for:

Barbuda and Anguilla

Sint Maarten

St. Martin

St. Barthelemy

A Hurricane Watch was in effect for:

Antigua

A Tropical Storm Warning was in effect for:

Antigua

Saba and St. Eustatius

A Tropical Storm Watch was in effect for:

Montserrat, St Kitts, and Nevwas

British Virgin Islands

St. Thomas and St. John

Hazards affecting land

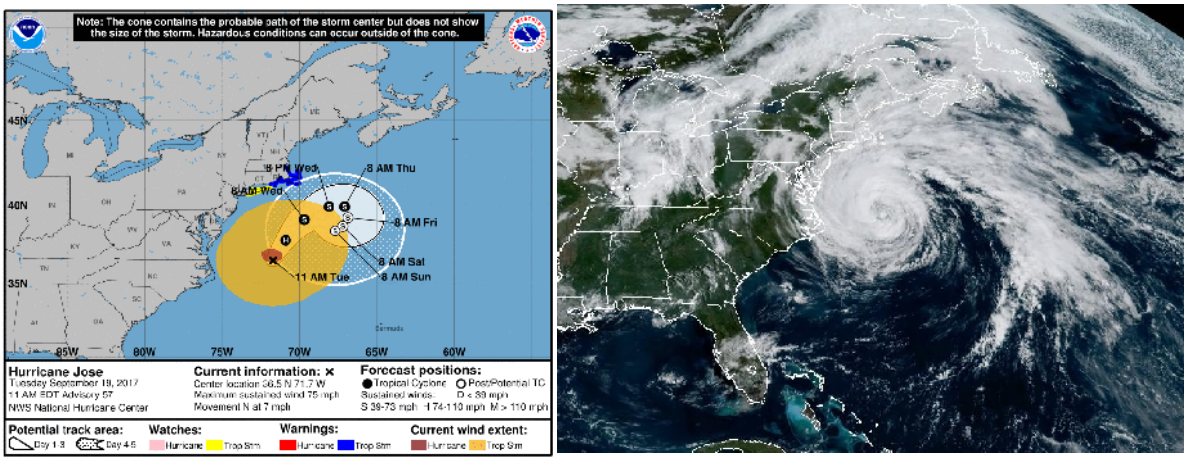
Hurricane conditions were possible within the hurricane watch area on Saturday, September 8 and tropical storm conditions were expected within the tropical storm warning areas by Saturday morning. Tropical storm conditions were possible in the tropical storm watch area in the northeastern Leeward Islands by Saturday morning and in the watch area in the Virgin Islands by Saturday night.

Jose was expected to produce total rain accumulations of 76.2 to 127 mm (3 to 5 inches) in the Leeward Islands from Guadeloupe to Anguilla, with isolated maximum amounts of 203.2 mm (8 inches). Jose was also expected to produce total rain accumulations of 25.4 to 76.2 mm (1 to 3 inches) over the Virgin Islands and Dominica. This rainfall had maintained any ongoing flooding and may caused additional life-threatening flooding.

Swells generated by Jose were expected to affect portions of the Leeward Islands beginning Friday afternoon (local time). These swells were likely to caused life-threatening surf and rip current conditions.

Featured image: Hurricane "Jose" (right) and Hurricane "Irma" (left) at 20:15 UTC on September 8, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

Hurricane "Jose" was a large tropical cyclone swirling off the coast of the eastern United States, producing dangerous surf and rip conditions along the coast for several more days.



At 15:00 UTC (11:00 EDT) on September 19, 2017, the center of Hurricane "Jose" was located 370 km (230 miles) ENE of Cape Hatteras, North Carolina and 545 km (335 miles) SSW of Nantucket, Massachusets. The cyclone has maximum sustained winds of 120 km/h (75 mph), making it a

Category 1 hurricane on the Saffir-Simpson scale. Jose was moving north at 11 km/h (7 mph) with the minimum central pressure of 976 hPa.

This general motion was expected to continued through with a turn to the northeast anticipated. On the forecast track, the center of Jose was expected to pass well offshore of Delmarva peninsula later (local time), pass well to the east of New Jersey coast, and pass offshore of southeastern Massachusets by Thursday, September 21.

Little change in strength was expected, but Jose should begin to gradually weaken.

A Tropical Storm Warning was in effect for:

Watch Hill to Hull

Block Island

Martha's Vineyard

Nantucket

Tropical Storm Watch was in effect for the coast of Long Island from Fire Island Inlet to Port Jefferson.

Interests elsewhere along the U.S. east coast from North Carolina northward to New England should monitor the progress of Jose, NHC advised.

Hurricane "Jose" at 14:45 UTC on September 19, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

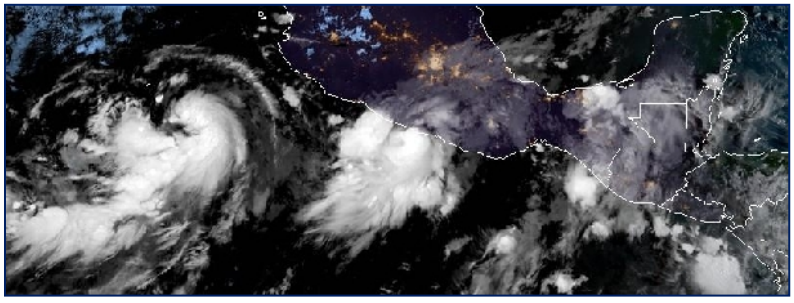
Swells generated by Jose were affecting Bermuda, the Bahamas, and much of the U.S. east coast. These swells were likely to caused dangerous surf and rip current conditions for the next several days in these areas.

Jose was expected to produce total rain accumulations of 25.4 to 76.2 mm (1 to 3 inches) over eastern Long Island, southeast Connecticut, southern Rhode Island, and southeast Massachusetts. Rainfall amounts of 76.2 to 127 mm (3 to 5 inches) were expected for Martha's Vineyard, Nantucket, and Cape Cod through Wednesday. This rainfall could caused isolated flooding.

As of September 19, Jose had been a hurricane for 11.5 days, surpassing Irma as the longest-lived Atlantic hurricane of the 2017 season to date.

Featured image: Hurricane "Jose" at 14:45 UTC on September 19, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

EVENT: Hurricane "Max" about to hit Mexico, dangerous storm surge and heavy rain expected, September 2017



Tropical Storm "Max" intensified into a Category 1 hurricane at 12:00 UTC on September 14, 2017. The government of Mexico had changed the Hurricane Watch and Tropical Storm Warning from Zihuatanejo to Punta Maldonado to a Hurricane Warning. A

dangerous storm surge was expected to produce significant coastal flooding near and to the east of where the center made landfall. Heavy rain produced by Max may produce life-threatening flash floods and mudslides. At 12:00 UTC on September 14, the center of Hurricane "Max" was located 85 km (55 miles) SW of Acapulco, Mexico. The system had maximum sustained winds of 120 km/h (75 mph) and was moving east at 9 km/h (6 mph). Its minimum central pressure was 992 hPa.

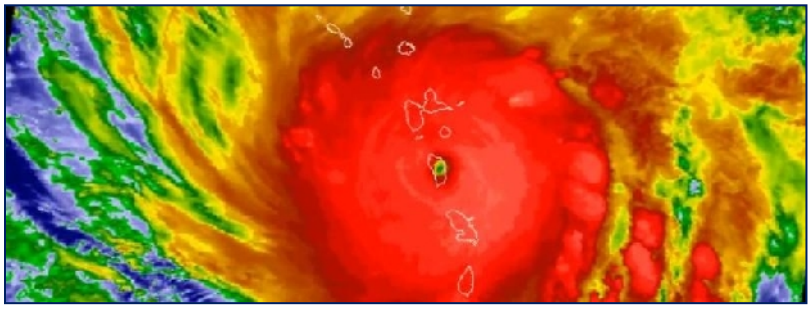
A Hurricane Warning was in effect for Zihuatanejo to Punta Maldonado, Mexico. Hurricane-force winds extend outward up to 20 km (10 miles) from the center, and tropical-storm-force winds extend outward up to 75 km (45 miles).

Max was expected to produce total rainfall accumulations of 127 to 254 mm (5 to 10 inches) in the Mexican state of Guerrero and western portions of the state of Oaxaca. Maximum amounts locally in excess of 508 mm (20 inches) were possible over coastal areas of Guerrero. These torrential rains may produce life-threatening flash floods and mudslides.

A dangerous storm surge was expected to produce significant coastal flooding near and to the east of where the center made landfall. Near the coast, the surge had been accompanied by large and destructive waves.

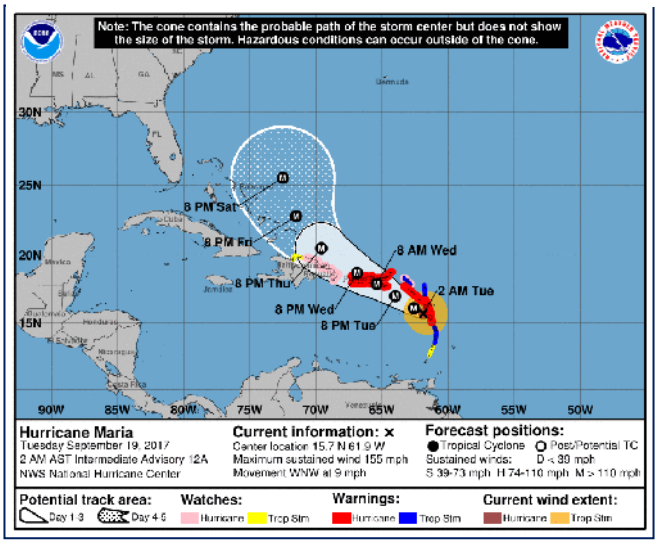
Featured image: Hurricane "Max" at 12:30 UTC on September 14, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

EVENT: Category 5 Hurricane "Maria" hits Dominica, Puerto Rico bracing for catastrophic impact, September 2017



The eye of Category 5 Hurricane "Maria" was raging across Dominica for more than 2 hours on September 19, 2017, as the strongest storm to hit Dominica ever. It hit the country's southeast regions about 01:00 UTC (21:00 local time) with maximum sustained winds of 260 km/h (160 mph) and exited in its northwest after 03:00 UTC (23:00 local time). Although some fluctuations in intensity were likely over the next 24 - 48 hours, Maria was forecast to remain an extremely dangerous hurricane

as it approaches the Virgin Islands and Puerto Rico. "We do not k what was happening outside. We do not dare look out. All we were hearing was the sound of galvanizing flying. The sound of the fury of the wind, as we pray for its end," Dominica's Prime Minister Roosevelt Skerrit said in a Facebook post as the hurricane raged through the island. "My roof was gone. I am at the complete mercy of the hurricane. House was flooding," he posted soon after that, as he was waiting to be rescued..



At 06:00 UTC on September 19, the center of Hurricane "Maria" was located 70 km (45 miles) WNW of Dominica and 380 km (235 miles) SE of St. Croix. Its maximum sustained winds were 250 km/h (155 mph), which placed Maria on the upper edge of Category 4 hurricane. The system was moving WNW at a speed of 15 km/h (9 mph) with the minimum estimated central pressure of 942 hPa. Some fluctuations in intensity were likely during the next day or two, but Maria was expected to remain an extremely dangerous Category 4 or 5 hurricanes while it approaches the Virgin Islands and Puerto Rico.

A Hurricane Warning was in effect for:

Guadeloupe

Dominica

St. Kitts, Nevwas, and Montserrat

U.S. Virgin Islands

British Virgin Islands

Puerto Rico, Culebra, and Vieques

A Tropical Storm Warning was in effect for:

Antigua and Barbuda

Saba and St. Eustatius

St. Maarten

Anguilla

St. Lucia

Martinique

A Hurricane Watch was in effect for:

Saba and St. Eustatius

St. Maarten

St. Martin and St. Barthelemy

Anguilla

Wasla Saona to Puerto Plata

A Tropical Storm Watch was in effect for:

St. Vincent and the Grenadines

West of Puerto Plata to the northern Dominican Republic-Haiti border

Interests elsewhere in Hispaniola, the southeastern Bahamas, and the Turks and Caicos Islands should monitor the progress of Maria. Additional watches and warnings may be required .

Winds over Dominica were diminishing. Hurricane conditions should spread throughout portions of the hurricane warning area in the Leeward Islands

A dangerous storm surge accompanied by large and destructive waves had raised water levels by as much as 2.1 to 3.3 m (7 to 11 feet) above normal tide levels in the hurricane warning area near where the center of Maria moves across the Leeward Islands and the British Virgin Islands.

The combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. The water was expected to reach the following heights above ground if the peak surge occurs at the time of high tide:

Puerto Rico and the U.S. Virgin Islands: 1.8 to 2.7 m (6 to 9 feet)

The deepest water had occurred along the immediate coast near and to the north and east of the landfall location, where the surge had been accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

Maria was expected to produce the following rain accumulations through Thursday:

Central and southern Leeward Islands: 254 to 381 mm (10 to 15 inches), isolated 508 mm (20 inches).

U.S. and British Virgin Islands: 254 to 381 mm (10 to 15 inches), isolated 508 mm (20 inches).

Puerto Rico: 304.8 to 457.2 mm (12 to 18 inches), isolated 635 mm (25 inches).

Northern Leeward Islands from Barbuda to Anguilla: 101.6 to 203.2 mm (4 to 8 inches), isolated 254 mm (10 inches).

Windward Islands and Barbados: 50.8 to 101.6 mm (2 to 4 inches), isolated 152.4 mm (6 inches).

Eastern Dominican Republic: 101.6 to 203.2 mm (4 to 8 inches), isolated 304.8 mm (12 inches).

Rainfall on all of these islands could caused life-threatening flash floods and mudslides.

Swells generated by Maria were affecting the Lesser Antilles. These swells were likely to caused life-threatening surf and rip current conditions.

Featured image: Category 5 Hurricane "Maria" hits Dominica on September 19, 2017. Credit: NOAA-GOES16, NWS OPC

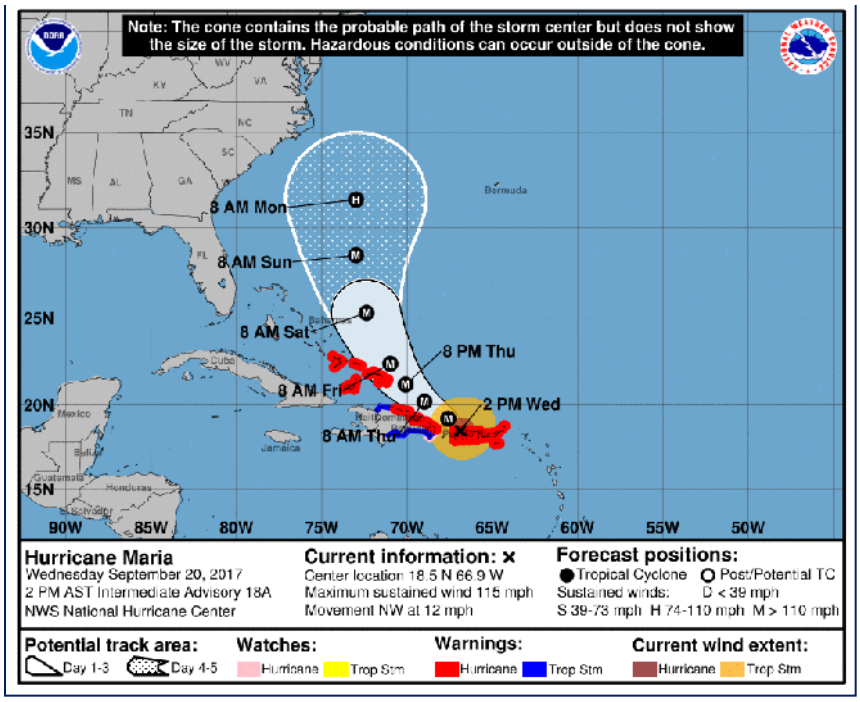
Category 4 Hurricane "Maria" made landfall in Puerto Rico at 10:15 UTC (06:15 AST) on Wednesday, September 20,

2017 with maximum sustained winds of 248 km/h (155 mph). This was the first Category 4 hurricane landfall in Puerto Rico since Hurricane "San Ciprian" of 1932. Before it hit Puerto Rico, Maria's eye raged across Dominica for more than 2 hours on September 19, causing widespread devastation. With winds of 260 km/h (160 mph), it was the strongest hurricane to hit the country ever.

On the forecast track, the center of Maria had moved away from the northwestern coast of Puerto Rico This afternoon. The center had then pass offshore of the northeastern coast of the Dominican Republic and Thursday, September 21 and then move near the Turks and Caicos Islands and southeastern Bahamas Thursday night and Friday, September 22.

"Buildings that meet the island's newer construction codes, estabilished around 2011, should be able to weather the winds, but wooden homes in flood-prone areas have no chance," Puerto Rico's governor, Ricardo Rosselló, said before the storm hit.

Maria made landfall near the coastal town of Yabucoa at 10:15 UTC (06:15 AST) as the strongest hurricane to make landfall in Puerto Rico since Category 5 Hurricane "San Felipe" of 1928, delivering huge amounts of rain and powerful winds that downed trees, ripped roofs and walls off of buildings and soon knocked out power to the entire island.



Puerto Rico's emergency management director, Abner Gomez, said at a midday press conference that the information they have received so far was not encouraging. "It's a system that has destroyed everything it has had in its path," he said.

As of 16:03 UTC (12:03 AST), several river gauges already recorded record levels (Rio Grande De Manati and Rio Grande de Werecibo).

Information received by afternoon (AST), the intense gusts had become less frequent and the lashing rains eased, giving residents their first glimpse of the storm's wake.

In the community of Juan Matos, located in Cataño, west of San Juan, 80 percent of the structures were destroyed, the mayor of Cataño told El Nuevo Dia. "The area was completely flooded. Water got into the houses. The houses have no roof. Most of them were made of wood and zinc, and electric poles fell on them."

In the capital of San Juan, buildings shook and glass windows shattered from the force of the storm. Residents of some high-rise apartments sought refuge in bathrooms and first-floor lobbies, but even those who sought out safe ground found themselves vulnerable, The Washington Post reported.

At 18:00 UTC (14:00 AST) on September 20, the center of Hurricane "Maria" was located just offshore of the northwestern coast of Puerto Rico; 29 km (15 miles) W of Werecibo, Puerto Rico and 155 km (95 miles) E of Punta Cana, Dominican Republic. Its maximum sustained winds were 185 km/h (115 mph), making it a Category 3 hurricane on the Saffir-Simpson wind scale. Maria's minimum central pressure based on the aircraft data was 961 hPa.

Maria was moving toward the northwest near 19 km/h (12 mph), and this general motion with a gradual decrease in forward speed was expected through early Friday.

On the forecast track, the center of Maria had moved away from the northwestern coast of Puerto Rico This afternoon. The center had then pass offshore of the northeastern coast of the Dominican Republic and Thursday and then move near the Turks and Caicos Islands and southeastern Bahamas Thursday night and Friday.

Little change in strength was forecast during the next 48 hours, and Maria was expected to remain a dangerous major hurricane through Friday.

A Hurricane Warning was in effect for:

- U.S. Virgin Islands
- British Virgin Islands
- Puerto Rico, Culebra, and Vieques
- Dominican Republic from Cabo Engano to Puerto Plata
- Turks and Caicos Islands and the Southeastern Bahamas

A Tropical Storm Warning was in effect for:

- Dominican Republic west of Puerto Plata to the northern border of the Dominican Republic and Haiti
- Dominican Republic west of Cabo Engano to Punta Palenque

A Hurricane Watch was in effect for:

- Dominican Republic from Wasla Saona to Cabo Engano

Hurricane "Maria" over Puerto Rico at 15:15 UTC on September 20, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

Hazards affecting land

Wind

Hurricane conditions had occurred over portions of Puerto Rico, and tropical storm conditions were continuing over the remainder of Puerto Rico and the Virgin Islands. Tropical storm conditions were likely beginning in the warning areas in the Dominican Republic, and hurricane conditions should start in the hurricane warning area. Tropical storm conditions were expected to

begin in the Turks and Caicos Islands and the southeastern Bahamas Thursday morning, with hurricane conditions starting Thursday evening.

Storm surge

The combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline.

The water was expected to reach the following heights above ground if the peak surge occurred at the time of high tide:

Puerto Rico 1.8 to 2.7 m (6 to 9 feet)

The deepest water had occurred along the immediate coast near and to the north and east of the landfall location, where the surge had been accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

A dangerous storm surge accompanied by large and destructive waves had raised water levels by as much as 1.2 to 1.8 m (4 to 6 feet) above normal tide levels in the hurricane warning area in the Dominican Republic, and 0.3 to 0.91 m (1 to 3 feet) elsewhere along the northern coasts of the Dominican Republic and Haiti.

A dangerous storm surge accompanied by large and destructive waves had raised water levels by as much as 3 to 4.5 m (10 to 15 feet) above normal tide levels in the hurricane warning area near and to the north of the center of Maria for both the Southeastern Bahamas and the Turks and Caicos Islands.

Rainfall

- Puerto Rico: 508 to 635 mm (20 to 25 inches), isolated 889 mm (35 inches).
- U.S. and British Virgin Islands: additional 127 to 254 mm (5 to 10 inches), isolated 381 mm (15 inches).
- Northern and eastern Dominican Republic, Turks and Caicos and southeast Bahamas: 203.2 to 406.4 mm (8 to 16 inches), isolated 508 mm (20 inches).
- Northern Haiti: 50.8 to 101.6 mm (2 to 4 inches).

Rainfall on these islands had caused life-threatening flash floods and mudslides

Tornadoes

Several tornadoes were possible over Puerto Rico and the U.S. Virgin Islands

Surf

Swells generated by Maria were affecting the Leeward Islands, Puerto Rico, and the Virgin Islands. These swells had begin affecting the northern coast of Hispaniola, the Turks and Caicos Islands, and the Southeastern Bahamas during the next day or two.

These swells were likely to caused life-threatening surf and rip current conditions.

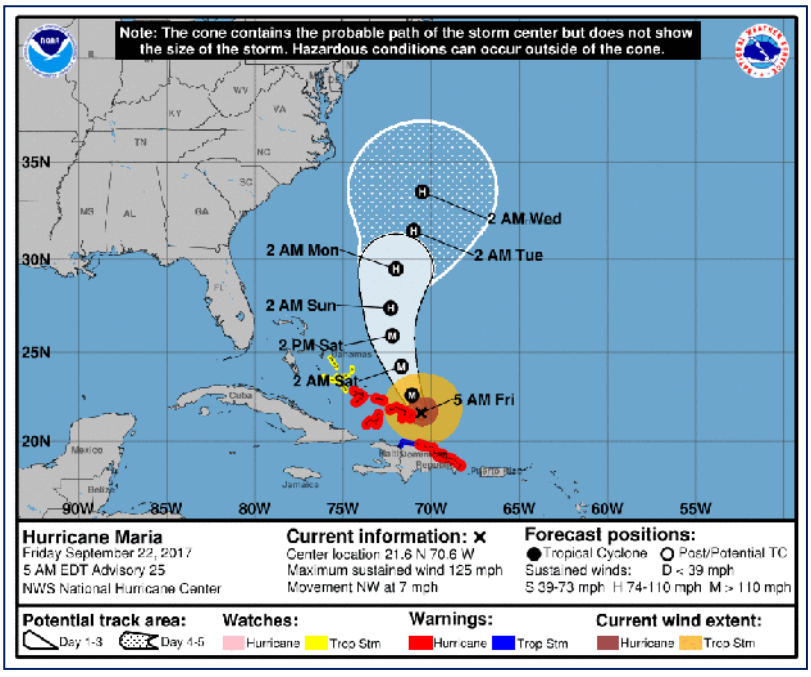
Featured image: Puerto Rico after Hurricane "Maria" on September 20, 2017. Credit: Live Storms Media

Maria's death toll rises to 37, Caribbean

Hurricane "Maria" has left a trail of destruction across the Caribbean islands and has so far claimed the lives of at least 37 people.

Maria was the 13th named storm, 7th hurricane, 4th major hurricane, and the 2nd Category 5 hurricane of the unusually active 2017 Atlantic hurricane season. It formed September 16 out of a tropical wave that was monitored by the NHC from September 13. It was the 3rd major hurricane in a row to threaten the Leeward Islands with a direct strike or major impacts within two weeks, after Hurricane Irma caused catastrophic damage there and Jose, then a Category 4 hurricane, passed dangerously close just days after.

By 23:30 UTC on September 18, Maria had strengthened to a Category 5 hurricane, making the 2017 Atlantic hurricane season the first since 2007 to feature two Category 5 hurricanes, and one of only six Atlantic hurricane seasons to feature two or more Category 5 hurricanes in the satellite era, as well as only the second (after 2007) to feature two hurricanes making landfall at Category 5 intensity.



Maria made landfall at 01:35 UTC on September 19 (21:35 AST, September 18) in Dominica as a Category 5 hurricane. With winds of 260 km/h (160 mph), it was the strongest hurricane to hit the country ever.

The extreme winds blew the roofs off many houses, including the official residence of Prime Minister Roosevelt Skerrit, who required rescue when his home began to flood. Skerrit called the devastation "mind boggling" and indicated immediate priority was to rescue survivors rather than assess the damage.

The situation on Dominica remained unclear for at least a day after the hurricane's passage, as downed cellular, radio and internet services cut the island off from the outside world. Initial radio reports from Roseau on September 19 indicated "total devastation," with half the city flooded, cars stranded, and stretches of residential area "flattened".

According to initial estimates, the hurricane caused damage to 90% of structures on Dominica, including to the roofs of those that had served as shelters.

At 10:35 UTC on September 20, Maria made landfall in Puerto Rico as a Category 4 hurricane with winds of 250 km/h (155 mph), becoming the strongest to hit the island since the Hurricane "San Felipe" of 1928, as well as the most intense hurricane to hit the territory in recorded history, and

the most intense to make landfall anywhere in the United States (including locations outside of the Lower 48) since Hurricane "Camille" in 1969.

Maria delivered huge amounts of rain and powerful winds that downed trees, ripped roofs and walls off of buildings and soon knocked out power to the entire island. Its electrical grid was being described as having been totally destroyed.

The islands of Guadeloupe and Martinique also endured widespread flooding, damaged roofs and uprooted trees.

As of September 22, the hurricane has caused at least 37 deaths: 15 in Dominica, 2 in Guadeloupe, 3 in Haiti, 15 in Puerto Rico and 2 in Dominican Republic.

As of 09:00 UTC (05:00 EDT) on September 22, 2017, the center of Category 3 Hurricane "Maria" was located 55 km (35 miles) ENE of Grand Turk Island. The system has maximum sustained winds of 205 km/h (125 mph) and was moving west at 11 km/h (7 mph). Its mimimum central pressure was 959 hPa

Authorities in Puerto Rico issued a Flash Flood Warning for Wasabela and Quebradillas municipalities on Friday, September 22, 2017, after Guajataca Dam operators reported that a failure at the dam was imminent.

At 01:30 AST (05:00 UTC) on September 23, dam operators continued to report that a failure of the Guajataca Dam was imminent, potentially causing life-threatening flash flooding downstream on the Rio Guajataca River. The National Weather Service had been running various dam break scenarios. Results indicate that a full breach would result in large peak flows that would reach the coast in under 12 hours. Flood extent mapping of these scenarios keep flows largely within the canyon river channel.

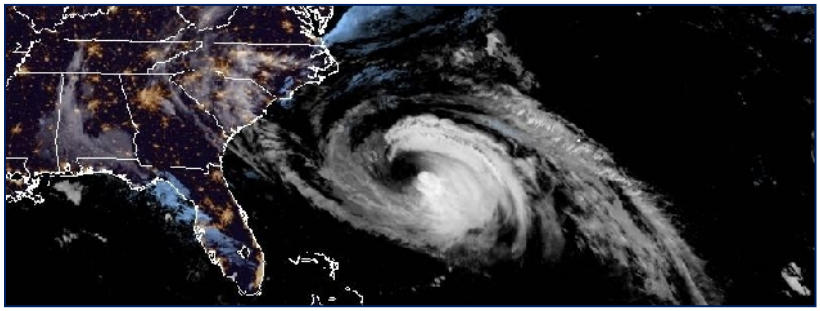
Guajataca Dam, Puerto Rico. Credit: Google

NWS warned all affected communities to move to higher ground. "This was an extremely dangerous and life-threatening situation. Do not attempt to travel unless you were fleeing an area subject to flooding or under an evacuation order. Act quickly to protect your life. Please heed instructions from authorities," the National Weather Service warned.

The Guajataca Dam was located 109 km (68 miles) west of San Juan. "It's a structural failure. I don't have any more details," Gov. Ricardo Rossello said Friday. "We're trying to evacuate as many people as possible."

Featured image: Guajataca Dam, Puerto Rico - September 2017. Credit: Weather Nation

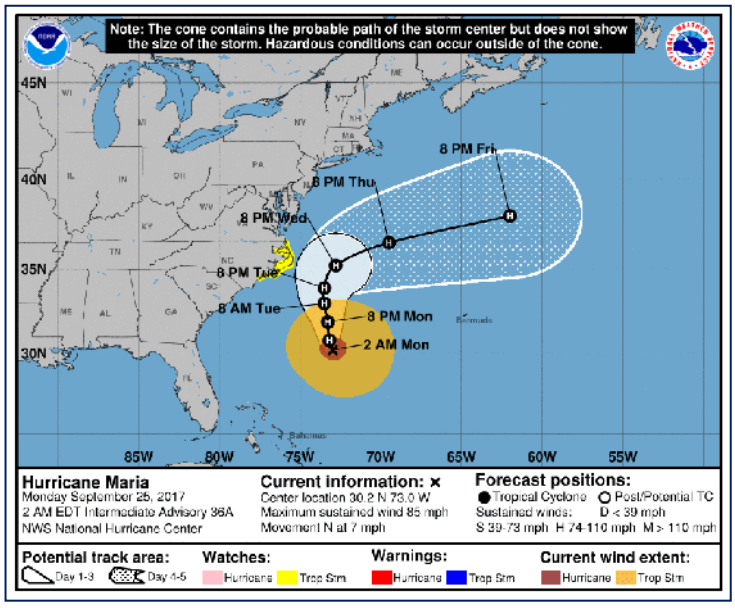
Hurricane "Maria" forces tropical storm and storm surge watches for North Carolina



A Tropical Storm Watch had been issued for the coast of North Carolina from Surf City northward to the North Carolina/Virginia border, including the Albemarle and Pamlico Sounds at 21:00 UTC (17:00 EDT) on Sunday, September 24, 2017. At the same time, a Storm Surge Watch had been issued for the coast of North Carolina from Cape Lookout northward to Duck.

At 06:00 UTC (02:00 EDT) on Monday, September 25, the center of Hurricane "Maria" was located 610 km (380 miles) SSE of Cape Hatteras, North Carolina. The system was moving north at 11 km/h (7 mph) with maximum sustained winds of 135 km/h (85 mph), making Maria a Category 1 hurricane on the Saffir-Simpson wind scale.

The minimum central pressure recently reported by the Hurricane Hunter aircraft was 954 hPa. On September 24, Maria's pressure dropped to 941 hPa. This was the lowest pressure for an Atlantic hurricane with maximum sustained winds less and equal to 168 km/h (105 mph) since Hurricane "Sandy" of 2012, according to Dr. Philip Klotzbach. "Low pressure relative to that what would be expected given the max winds observed means that the storm was generally large in size."



Tropical storm conditions were possible within the watch area beginning Tuesday, September 26.

The combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. The water was expected to reach the following heights above ground if the peak surge occurred at the time of high tide:

Cape Lookout to Duck including the sound side of the Outer Banks: 0.6 - 1.2 m (2 - 4 feet).

Surge-related flooding depends on the relative timing of the surge and the tidal cycle and can vary greatly over short distances

Swells generated by Maria were increasing along portions of the southeastern United States coast and Bermuda and had been increasing along the Mid-Atlantic coast and Monday (local time). Swell also continued to affect Puerto Rico, the Virgin Islands, the northern coast of Hispaniola, the Turks and Caicos Islands, and the Bahamas.

These swells were likely to caused life-threatening surf and rip current conditions.

Featured image: Hurricane "Maria" at 08:30 UTC on September 25, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

Puerto Rico death toll rises to 45, 113 still missing, 85% without power

According to latest figures, the death toll in Puerto Rico caused by the passage of Category 4 Hurricane "Maria" on September 20, 2017, has risen to 45. There were still 113 people unaccounted for.

Most of the island was still without basic services such as power and running water, nearly three weeks after the storm. As of Thursday, October 12, 83% of the island was still without electricity, 45% of it was without phone service. There were still 107 opened shelters with 5 602 sheltered.

According to a letter obtained by CNN, Governor Ricardo Rosselló, citing an "unprecedented catastrophe," has lobbied Capitol Hill for a significant new influx of money soon as the island perches on the brink of "a massive liquidity crisis."

In a three-page letter sent to congressional leaders, Rosselló was requesting more than $4 billion from various agencies and loan programs to "meet the immediate emergency needs of Puerto Rico."

The governor also pointed to a potential exodus of the island's inhabitants should aid not be available in a timely manner - something he has also emphasized in conversations with lawmakers. Over 400 000 Puerto Ricans have moved to the mainland United States since 2004, according to the Pew Research Center. Puerto Rico has 3.4 million residents.

Maria made landfall at 10:35 UTC on September 20, as a Category 4 hurricane with winds of 250 km/h (155 mph), becoming the strongest to hit the island since the Hurricane "San Felipe" of 1928, as well as the most intense hurricane to hit the territory in recorded history, and the most intense to make landfall anywhere in the United States (including locations outside of the Lower 48) since Hurricane "Camille" in 1969.

It delivered huge amounts of rain and powerful winds that downed trees, ripped roofs and walls off of buildings and soon knocked out power to the entire island. Its electrical grid was being described as having been totally destroyed.

Featured image: San Juan, Puerto Rico after Hurricane "Maria" - September 20, 2017. Credit: Live Storms Media

45% of Puerto Rico without power 3 months after Hurricane "Maria"

Nearly half of Puerto Rico was still without power three months after

Hurricane "Maria" devastated the island, officials said Friday, December 29, 2017.45% of nearly 1.5 million customers in Puerto Rico were still without power after a Category 4 Hurricane "Maria" devastated the island on September 20. Authorities had previously reported power generation (standing at 69.8% as of December 29), but This was the first time they provided that statistic.

Puerto Rico has 3 862 km (2 400 miles) of transmission lines, 48 280 km (30 000 miles) of distribution lines and 342 substations that suffered substantial damage during the hurricane, AP reported. Government officials said nearly 14 000 poles already have been shipped to Puerto Rico, and that another 7 000 had arrive in upcoming days. In addition, some 3 500 workers were trying to restore power across the island.

The U.S. Army Corps of Engineers estimated it had takeen until May 2018 before the entire island was connected.

As of December 29, telecommunication services were 93.5% restored, 88% of gas stations (970 of 1 100) were operational as well as 92% of supermarkets (437 of 471). All ports were functioning normally. You can check the progress at This site.

Category 4 Hurricane "Maria" made landfall in Puerto Rico at 10:15 UTC (06:15 AST) on Wednesday, September 20, 2017 with maximum sustained winds of 248 km/h (155 mph).

This was the first Category 4 hurricane landfall in Puerto Rico since Hurricane "San Ciprian" of 1932. Before it hit Puerto Rico, Maria's eye raged across Dominica for more than 2 hours on September 19, causing widespread devastation. With winds of 260 km/h (160 mph), it was the strongest hurricane to hit the country ever.

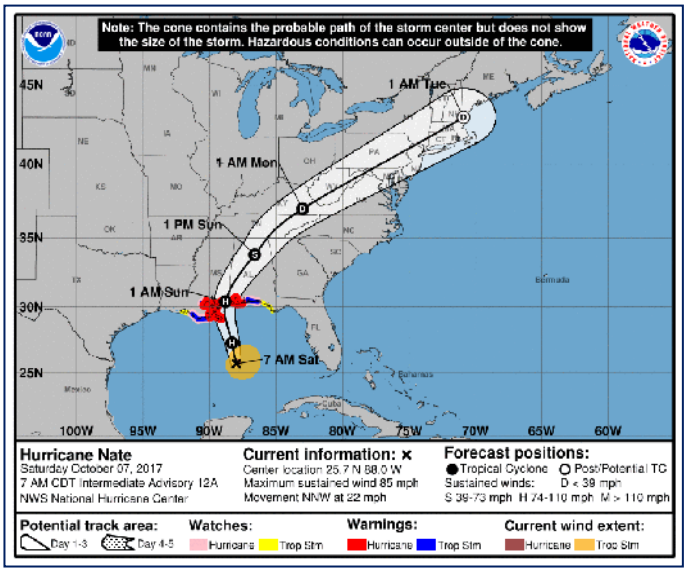
Featured image: Hurricane "Maria" over Puerto Rico at 15:15 UTC on September 20, 2017. Credit: NOAA/GOES-16 (preliminary and non-operational)

- **October…….**

EVENT: Powerful, fast-moving Hurricane "Nate" to slam into US Gulf Coast, October 2017

After killing at least 22 people in Central America, Nate was a Category 1 hurricane on its way toward the US Gulf Coast. Its center had moved across the central and northern Gulf of Mexico and make landfall as Category 1 hurricane or stronger along the central U.S. Gulf coast (CDT). Nate was bringing heavy rain, powerful winds, dangerous storm surge and life-threatening surf and rip-conditions. Isolated tornadoes had been possible beginning later over parts of the central Gulf Coast region. This was a powerful and fast-moving storm. Nate prompted evacuations in low-lying coastal Louisiana parishes and Alabama and Mississippi and many preparations have already taken place. However, those still underway needs to be rushed to completion as conditions along the coast had rapidly

deteriorate starting Saturday afternoon (local time). Nate had most likely be a strong Category 1 hurricane possibly Category 2 as it made landfall Saturday evening into Saturday night (CDT).



Vulnerable, low-lying coastal areas, such as New Orleans; Mobile, Alabama; Biloxi, Mississippi; and Pensacola, Florida, should treat Nate as a serious threat for flooding from heavy rain and storm surge, Accu Weather's meteorologists warn. "New Orleans levees that have been upgraded since Katrina and pumps that have been repaired in recent weeks may be tested This weekend," according to Accu Weather Expert Meteorologist and Chief Operating Officer Evan Myers.

The fast-forward motion of the storm had push more water inland on its eastern and northern side, when compared to a slow-moving storm of equal strength.

At 12:00 UTC (07:00 CDT) on October 7, 2017, the center of Hurricane "Nate" was located 395 km (245 miles) SSE of the mouth of the Mississippi River. Nate has maximum sustained winds of 135 km/h (85 mph) and was moving NNW at 45 km/h (22 mph) with minimum central pressure of 986 hPa.

This general fast motion was expected to continue through. Hurricane-force winds extend outward up to 55 km (35 miles) from the center and tropical-storm-force winds extend outward up to 205 km (125 miles).

Hurricane Warning was in effect for:

Grand Wasle Louisiana to the Alabama/Florida border

Metropolitan New Orleans and Lake

A Storm Surge Warning was in effect for:

Morgan City Louisiana to the Okaloosa/Walton County Line Florida

Northern and western shores of Lake Pontchartrain

A Tropical Storm Warning was in effect for:

Lake Maurepas

West of Grand Wasle to Morgan City Louisiana

East of the Alabama/Florida border to the Okaloosa/Walton County Line

A Hurricane Watch was in effect for:

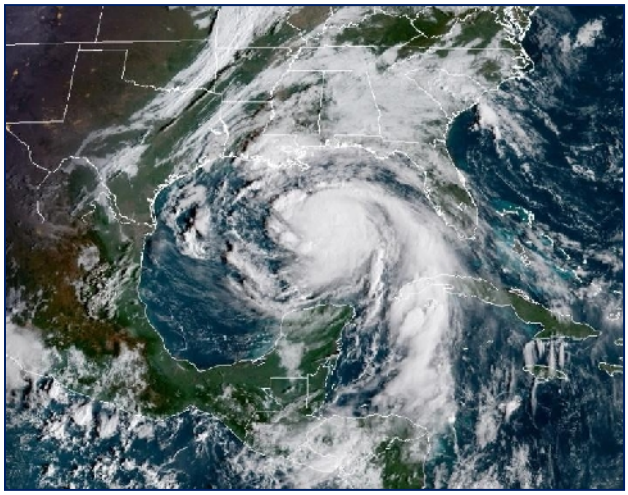
Lake Maurepas

East of the Alabama/Florida border to the Okaloosa/Walton County Line

West of Grand Wasle to Morgan City Louisiana

A Storm Surge Watch was in effect for:

East of the Okaloosa/Walton County Line to Indian Pass Florida



A Tropical Storm Watch was in effect for:

East of the Okaloosa/Walton County Line to Indian Pass Florida

West of Morgan City to Intracoastal City Louisiana

Hurricane "Nate" at 13:45 UTC on October 7, 2017. Credit: NOAA/GOES-16

Hazards affecting land

In the United States, the combination of a dangerous storm surge and the tide had caused normally dry areas near the coast to be flooded by raising waters moving inland from the shoreline. The water was expected to reach the following heights above ground if the peak surge occurred at the time of high tide:

- Morgan City, Louisiana to the mouth of the Mississippi River: 1.2 to 1.8 m (4 to 6 feet)
- Mouth of the Mississippi River to the Alabama/Florida border: 1.5 to 2.7 m (5 to 9 feet)
- Alabama/Florida border to the Okaloosa/Walton County Line: 1.2 to 1.8 m (4 to 6 feet)
- Okaloosa/Walton County Line to Indian Pass, Florida: 0.6 - 1.2 m (2 to 4 feet)
- Indian Pass to Crystal River, Florida: 0.3 to 0.9 m (1 to 3 feet)

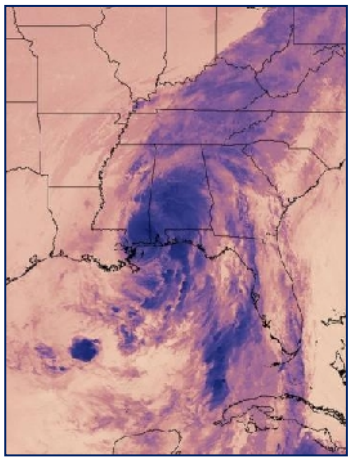
The deepest water had occurred along the immediate coast near and to the east of the landfall location, where the surge had been accompanied by large and destructive waves. Surge-related flooding depends on the relative timing of the surge and the tidal cycle, and can vary greatly over short distances

Isolated tornadoes had been possible beginning later over parts of the central Gulf Coast region.

Swells generated by Nate affected land areas around the western Gulf of Mexico during the next day or so. These swells were likely to caused life-threatening surf and rip current conditions.

Nate weakening as it heads inland over Deep South, 120 000+ without power

Hurricane "Nate" made its first landfall near the mouth of the Mississippi River, southeastern Louisiana around 00:00 UTC on October 8 (19:00 CDT, October 7) and its second near Biloxi, Mississippi around 05:30 UTC (00:30 CDT) with winds near 140 km/h (85 mph), making it a Category 1 hurricane on the Saffir-Simpson wind scale. This was the first hurricane to make landfall in Mississippi since Katrina in 2005. Nate has since weakened into a tropical

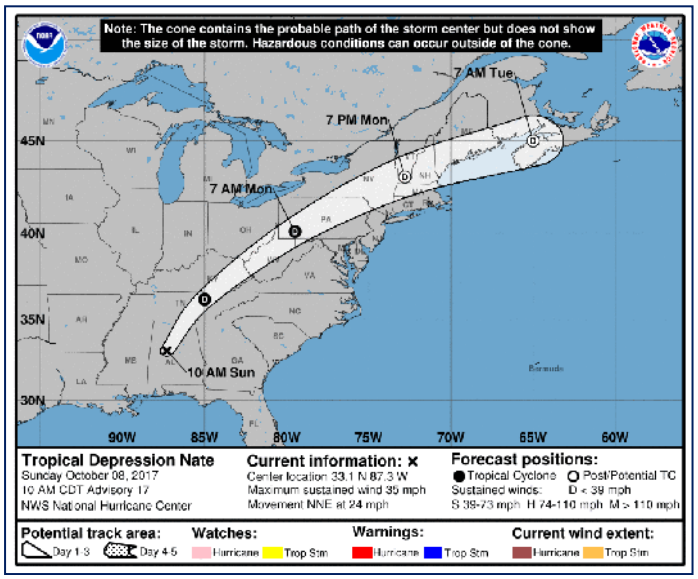


depression and it continued weakening as it moves inland over the Deep South toward Tennessee, Kentucky, West Virginia, Pennsylvania and New York.

According to the NWS, Nate was moving toward the coastline at a speed of 45 km/h (28 mph), which was the fastest recorded forward motion of a hurricane in the Gulf of Mexico on record.

Ahead of its arrival, states of emergency were declared in Louisiana, Mississippi, Alabama and the Florida Panhandle ahead of Nate's arrival.

Waves measuring higher than 9.1 m (30 feet) have been measured by a buoy east of the center of Nate around 00:30 UTC. A buoy closer to the center measured sustained winds of over 112 km/h (70 mph) and gusts near 145 km/h (90 mph). Power outages, at least 5 000 customers in southern Alabama, were reported before its second landfall.



There were numerous reports of storm surge flooding along the central Gulf Coast. Between 0.9 and 1.5 m (3 and 5 feet) of storm surge had been reported from St. Bernard County, Louisiana to Mobile County, Alabama. Around 40 roads in southern Mississippi have been flooded due to storm surge.

By 05:30 UTC, when Nate made its second landfall, the number of homes without power climbed to at least 11 000, with 6 000 in southern Mississippi. By 07:30 UTC, over 9 500 customers in Mississippi were without power and over 23 000 in Alabama. By 08:30 UTC, the total number of customers without power climbed to 60 000 and by 13:00 UTC to more than 120 000 across the Gulf Coast.

Major flooding was seen overnight in Biloxi, Mississippi and Mobile, Alabama, and several water rescues. Luckily, there were no injuries or deaths.

Nate weakened into a tropical depression by 15:00 UTC when its center was located about 65 km (40 miles) SW of Birmingham, Alabama. Its maximum sustained winds, at the time, were 55 km/h (35 mph). Nate was moving NNE at 39 km/h (24 mph) with minimum central pressure of 996 hPa.

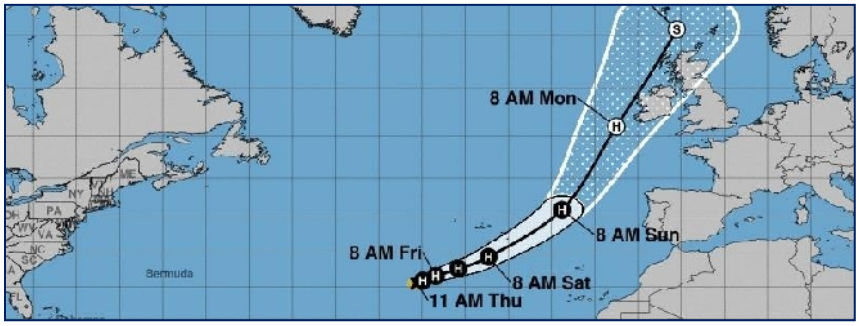
A turn toward the northeast with an increase in forward speed was expected during the next couple of days. East of the Mississippi River from the central Gulf Coast into the Deep South, eastern Tennessee Valley, and southern Appalachians: 76 to 152 mm (3 to 6 inches), max 254 mm (10 inches). Across the Ohio Valley into the central Appalachians: 50.8 to 127 mm (2 to 5 inches), max 178 mm (7 inches)

A couple tornadoes had been possible, mainly from the Florida Panhandle and eastern Alabama across western and northern Georgia into the western Carolinas.

Swells generated by Nate affected land areas around the Gulf of Mexico through This evening. These swells were likely to caused life-threatening surf and rip current conditions.

Featured image: Storm surge in Biloxi, Mississippi after Hurricane "Nate" landfall - October 8, 2017. Credit: StormChasingVideos

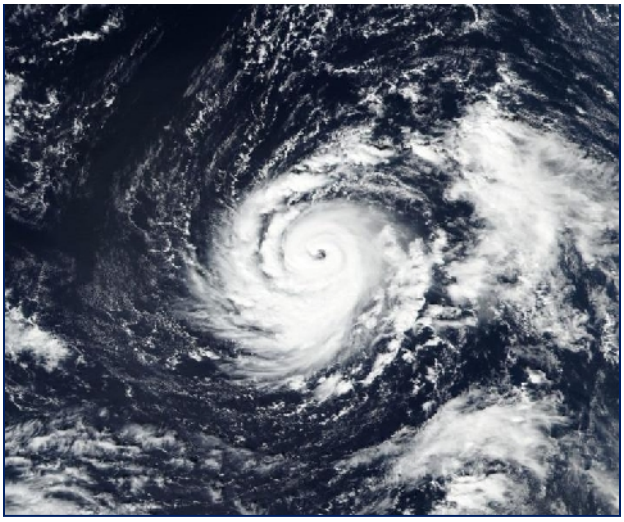
EVENT: Ophelia was 10th consecutive Atlantic hurricane - tying the all-time record set in 1878, October 2017

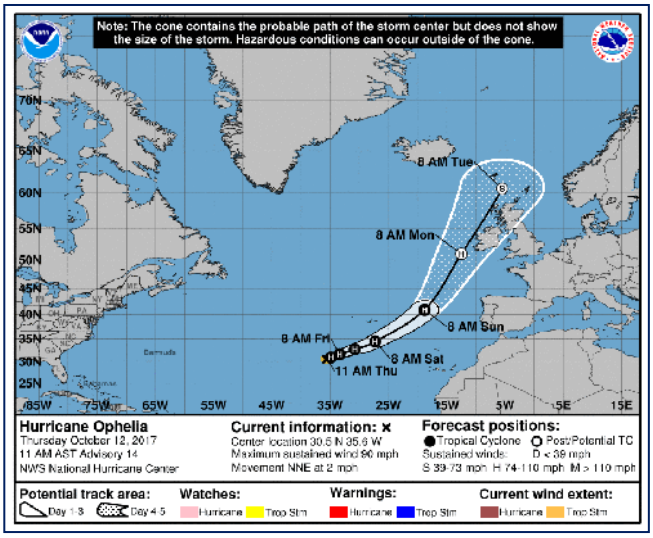


Ophelia became a hurricane on October 11, 2017 thus becoming the 10th consecutive Atlantic named storm to reach hurricane status, tying the all-time record set in 1878 and equaled in 1886 and 1893, according to Dr. Philip Klotzbach, a meteorologist at CSU specializing in Atlantic basin seasonal hurricane forecasts.

Ophelia was expected to transition to a hurricane-force post-tropical cyclone by Monday, October 16 when it moves near Ireland and the United Kingdom. While the system had likely brought some direct impacts to portions of these areas, given the forecast uncertainty at these time ranges it was too soon to determine the exact magnitude, timing and location of the impacts.

At 15:00 UTC on October 12, 2017, the center of Hurricane "Ophelia" was located 1 145 km (715 miles) SW of the Azores. It had maximum sustained winds of 150 km/h (90 mph) and minimum estimated central pressure 978 hPa.

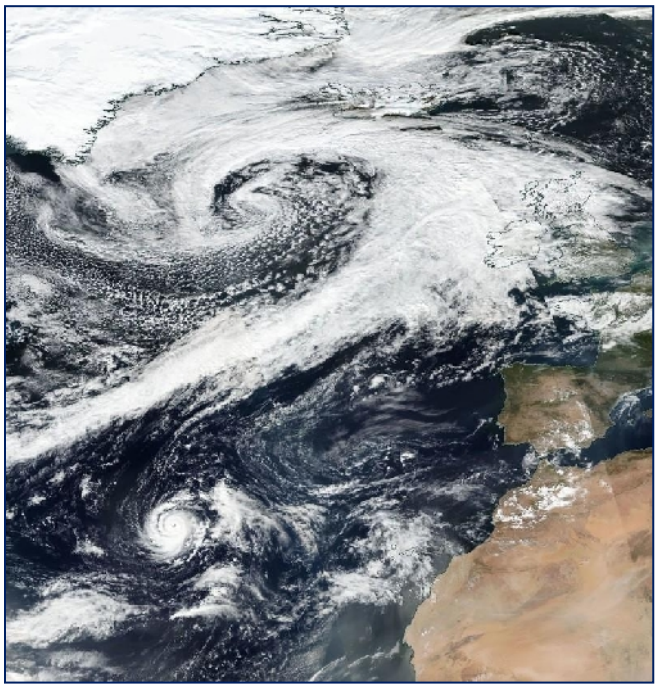




Hurricane "Ophelia" satellite image on October 12, 2017. Credit: NASA/NOAA Suomi NPP / VIIRS

Ophelia's satellite presentation consists of a distinct eye in infrared imagery surrounded by a ring of cloud tops of -50 to -70 °C (-58 to -94 °F). Little change in intensity was expected during the next 48 hours, as Ophelia had remain over sea surface temperatures of 25 - 26 °C (77 - 78.8 °F) and in a low to moderate shear environment, NHC's forecaster Brennan noted.

After that time, the cyclone should begin extra tropical transition as it interacts with a potent mid-latitude trough moving eastward across the North Atlantic. This baroclinic interaction should maintain Ophelia at hurricane intensity through 96 hours, with slow weakening expected after that time as the extra tropical cyclone occludes.



Hurricane "Ophelia" satellite image on October 12, 2017. Credit: NASA/NOAA Suomi NPP / VIIRS

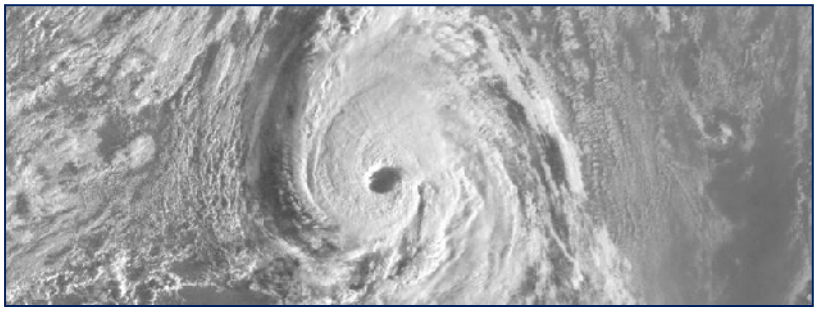
Ophelia was expected to transition to a hurricane-force post-tropical cyclone by Monday, October 16 when it moves near Ireland and the United Kingdom. While post-tropical Ophelia had likely brought some direct impacts from wind and heavy rain to portions of these areas, as well as dangerous marine conditions, given the forecast uncertainty at these time ranges it was too soon to determine the exact magnitude, timing and location of the impacts.

Residents in Ireland and the United Kingdom should monitor the progress of Ophelia for the next several days.

Due to This system, the 2017 Atlantic hurricane season has moved up into 7th place for full-season Atlantic Accumulated Cyclone Energy (ACE), surpassing 1950. The Atlantic had produced 48 hurricane days this year, which was the most through October 12 since 1995 and 6thmost on record through October 12, according to Klotzbach.

It was a very destructive season and likely the costliest on record, with a preliminary total of over US$186.8 billion in damages, nearly all of which was due to three of the major hurricanes of the season - Harvey, Irma, and Maria.

The season was also one of only six years to feature multiple Category 5 hurricanes. This season was the only season on record in which three hurricanes each had an ACE of over 40: Irma, Jose, and Maria.



The season officially began on June 1 and hadend on November 30. Plenty of time for more records.

Featured image: Hurricane "Ophelia" forecast track by NHC at 15:00 UTC on October 12, 2017

The center of record-breaking Category 3 Hurricane "Ophelia" was expected to pass to the southeast of the Azores around 00:00 UTC on October 15, 2017 and then head toward Ireland and the United Kingdom. Ophelia was expected to be a powerful extratropical cyclone with hurricane force winds Monday while it moves near Ireland and the United Kingdom. Direct impacts from wind and heavy rain in portions of these areas were likely, along with dangerous marine conditions.

Ophelia was a major hurricane, the farthest east (26.6°W) an Atlantic major hurricane has existed on record. It was also the 6th major hurricane of 2017 Atlantic hurricane season, tied with 1993, 1961, 1964 and 2004 for most major hurricanes through October 14, according to CSU meteorologist Dr. Philip Klotzbach. In addition, Ophelia was the 10th consecutive Atlantic named storm to reach hurricane status, tying the all-time record set in 1878 and equaled in 1886 and 1893.

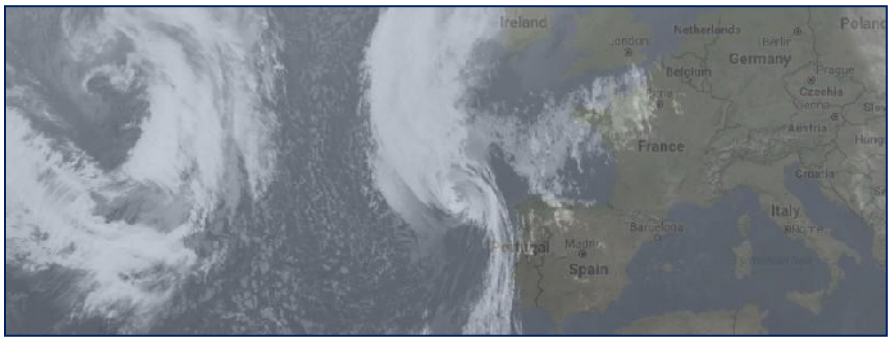
At 15:00 UTC (11:00 AST) on October 14, 2017, the center of Hurricane "Ophelia" was located 335 km (220 miles) south of the Azores. Its maximum sustained winds were 185 km/h (115 mph), making Ophelia a Category 3 hurricane on the Saffir-Simpson Hurricane Wind Scale. The system was moving NE at 41 km/h (25 mph) with minimum central pressure of 960 hPa.

The exceptionally active 2017 Atlantic hurricane season was likely the costliest on record, with a preliminary total of over US$186.8 billion in damages, nearly all of which was due to three of the major hurricanes of the season - Harvey, Irma, and Maria.

The season was also one of only six years to feature multiple Category 5 hurricanes and the only season on record in which three hurricanes each had an ACE of over 40: Irma, Jose, and Maria.

The season officially began on June 1 and had end on November 30.

As we already said, there was still plenty of time for more records.



Hurricane "Ophelia" had been the most severe weather event to hit Ireland since Hurricane "Debbie" hit in 1961, resulting in 15 deaths, Met Eireann, the Irish National Meteorological Service warns. Ophelia was expected to be near the southwest tip of Ireland by Monday morning, October 16, 2017 - RED level severe weather warnings were in place. The UK Met Office has issued Amber and Yellow warnings for Northern Ireland. Preparations to protect lives and property should be finished.

"This had been a significant weather event for Ireland with potentially high impacts – structural damage and flooding (particularly coastal) - and people were advised to take extreme cwere and keep up to date with the warnings," Met Eireann warns.

At the same time, damaging winds had accompanied the low center with wind gusts of 130 km/h (81 mph) or more. The most severe winds had been in coastal counties, with lower impacts likely for central areas. "A dangerous storm surge was expected to produce significant coastal flooding near and to the east of where the center of the post-tropical cyclone made landfall. Near the coast,

the surge had been accompanied by large and destructive waves," Met Eireann said in their Hurricane "Ophelia" update issued 18:00 UTC, Sunday, October 15.

Met Office warnings for the United Kingdom

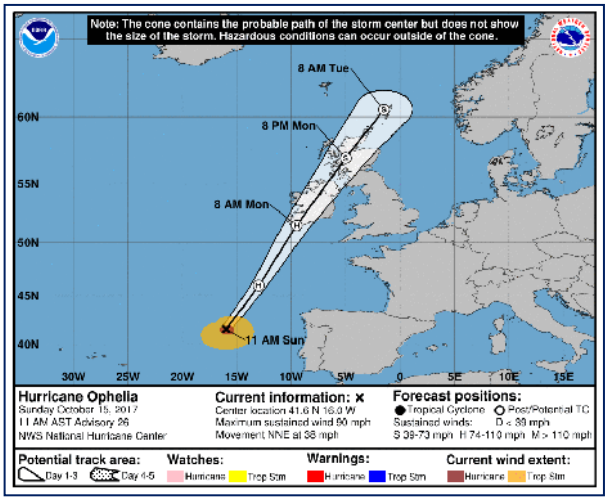
The UK Met Office has issued Amber and Yellow warnings for Northern Ireland.

Amber warning for wind

Ex-Ophelia had cross northern parts of Ireland during Monday afternoon and evening (local time), October 16 bringing some very strong winds to Northern Ireland. Gusts of 88 - 105 km/h (55 - 65 mph) were likely across Northern Ireland with 113 - 129 km/h (70 - 80 mph) gusts in the far southeast. A smaller area of very gusty winds was then likely to run across Northern Ireland from the west with 105 - 121 km/h (65 - 75 mph) gusts possible for a short period of time in any one location. Both of these areas of very strong winds may well occurred during a busy traveling period.

Regions and local authorities affected:

- County Antrim
- County Londonderry
- County Tyrone
- County Fermanagh
- County Armagh
- County Down



Regions and local authorities affected:

- Central, Tayside & Fife
- Highlands & Eilean Siar
- North East England
- North West England
- Northern Ireland
- SW Scotland, Lothian Borders
- South West England
- Strathclyde
- Wales
- West Midlands
- Yorkshire & Humber

Ophelia was expected to produce rainfall amounts of 50 to 75 mm (2 to 3 inches) with isolated totals near 100 mm (4 inches) through Tuesday across western Ireland and Scotland. Across eastern Ireland, rainfall amounts had average around 25 mm (1 inch) or less.

A dangerous storm surge was expected to produce significant coastal flooding near and to the east of where the center of the post-tropical cyclone made landfall. Near the coast, the surge had been accompanied by large and destructive waves.

Over 360 000 homes and businesses were without power in Ireland as Ex-Hurricane "Ophelia" tracks over the country with hurricane-force winds. At least three people have lost their lives. Ophelia reached Ireland early Monday morning, October 16, 2017 hitting Munster and south Leister

in the south of the country with violent and destructive winds, rapidly extending to the rest of the country.

"The strongest winds were on the eastern and southern flank of Ophelia's low pressure center," Met Eireann, the Irwash National Meteorological Service said. "The heaviest rain was on the northwestern and western flank. To the east of the path of the storm center winds hadback southeasterly ahead of its passage north, veering southwesterly behind it. Winds had been cyclonic along the Atlantic Seaboard."

Winds had gradually abate from the south through Rainfall:

- 17 mm (0.66 inches) at Valentia, including 9 mm (0.35 inches) in one hour
- 17 mm (0.66 inches) at Mace Head, including 8 mm (0.31 inches) in the past hour

Winds unleashed by the storm brought down trees and power lines across the country, closing roads and causing unprecedented power outages.

The majority of customers were expected to remain without power for several days.

Bernadette Maloney, head of corporate affairs for the ESB Networks, said they hope crews from other countries had assist Ireland as the country tries to recover from the most powerful storm to hit the country in half a century.

"We've gone to help France in the past and the UK, so those favors had been reciprocated as well," she said.

"When Storm Darwin hit a number of years ago the number of customers affected was around 250 000 in total, so this was far in excess of the people who were affected during Storm Darwin.

"The number of outages was increasing all the time as the storm progresses across the country

"Crews were beginning to go out and assess the damage and when the storm has passed, people may get out and about but there may be power lines down. Do not approach them. They were live and dangerous."

The Department of Education has advised that all schools remain closed on Tuesday, October 17, 2017.

At least three people have lost their lives. One woman tragically died in Waterford after a tree fell on the car she was traveling in. One man died in Tipperary after he was fatally injured with a chainsaw he used to clear a fallen tree. Another man died in Louth after a tree crushed his car.

A RED severe weather warning, the highest, was for the entire Ireland.

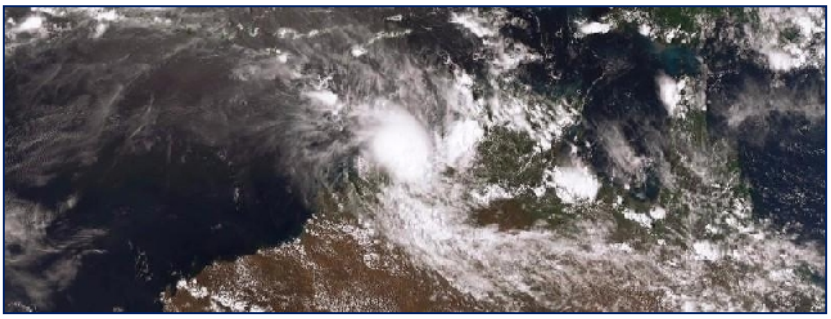
Featured image: Ex-Hurricane "Ophelia" at 10:25 UTC on October 16, 2017. Credit: Met Eireann

CYCLONES

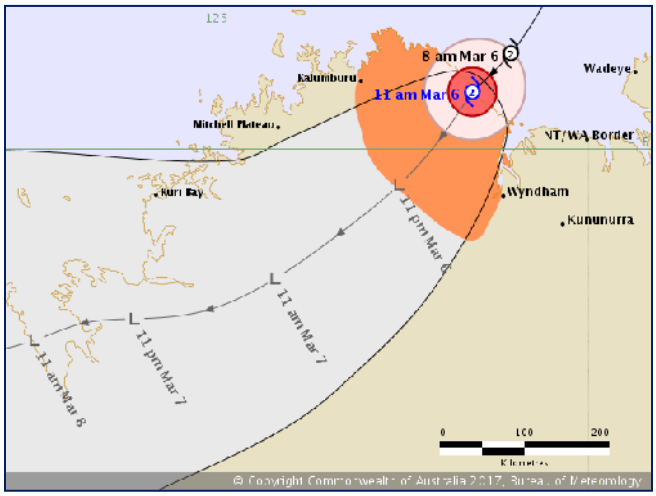
Category: Natural

- **March…….**

EVENT: Category 2 tropical cyclone Blanche hits Western Australia, March 2017



Tropical Cyclone "Blanche" formed late March 5, 2017 in the Timor Sea and soon crossed the Kimberly coast between Wyndham and Kalamburu, Western Australia as Category 2 system on the Australian tropical cyclone intensity scale. This was the equivalent of a Category 1 hurricane on the Saffir-Simpson hurricane wind scale. As the cyclone formed and strengthened, Bathurst Island recorded 384 mm (15.1 inches), which has smashed the previous daily rainfall total by more than 100 mm (3.9 inches).Blanche had sustained winds near the center of 95 km/h (59 mph) with wind gusts to 130 km/h (81 mph), the Australian Bureau of Meteorology. It was moving southwest at 18 km/h (11 mph). The agency said destructive winds with gusts to 150 km/h (93 mph) were being experienced between Kalumburu and Wyndham in WA. Gales with gusts to 120 km/h (74 mph) were also being experienced between Wyndham and Kalumburu in W. Tides had been higher than normal between Wyndham and Kalumburu in WA during . Large waves may produce minor flooding of low-lying coastal areas.



Tropical Cyclone "Blanche" forecast track by BOM on March 6, 2017"

A Yellow Alert was in effect between Wyndham and Kalumburu and coastal communities, people need to take action and get ready to shelter from a cyclone.

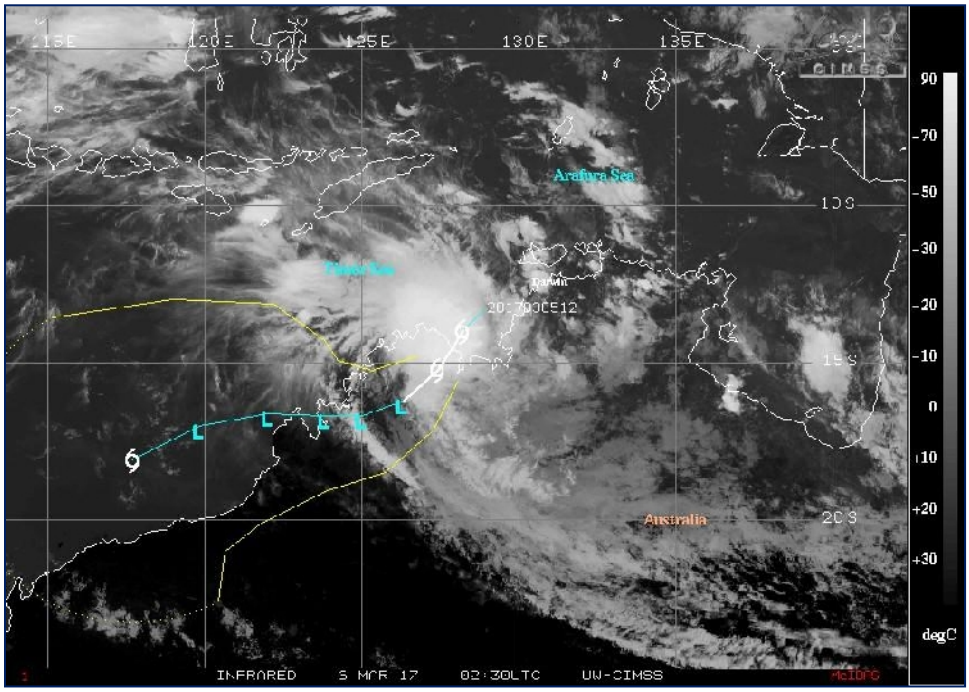
Blue Alert was in effect between WA/NT Border to Kununurra and people need to prepare for cyclonic weather and organize an emergency kit including first aid kit, torch, portable radio, spare batteries, food and water.

Blanche was expected to weaken and continued to move SW over Western Australia.

The system was dumping heavy rain on already saturated catchments. Between 200 and 300 mm (7.9 - 11.8 inches) of rain was expected through the Kimberly region to the north of the Wyndham

area. As Blanche continueds to more southwards that rain had extend further inland. Since it's been a very wet season so far, it's not going to take much to see river rises and some flooding, BOM said.

Flood warnings were in effect for the Kimberly catchment.

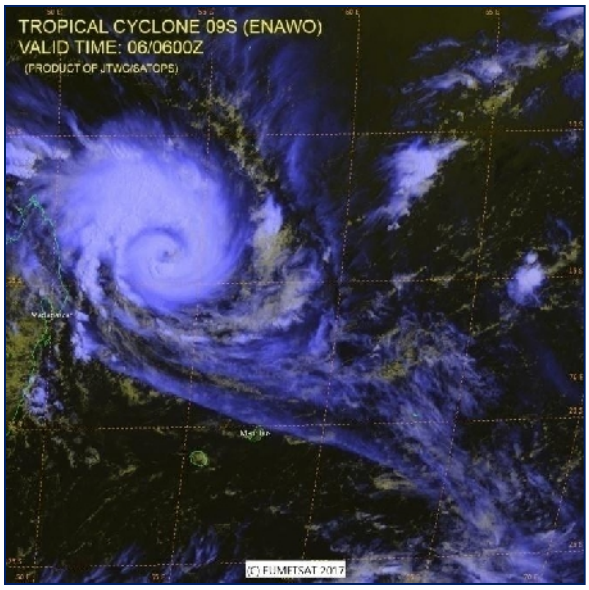


Tropical Cyclone "Blanche" forecast track by JTWC at 00:00 UTC on March 6, 2017. Credit: UW-CIMSS

Featured image: Tropical Cyclone "Blanche" hits Western Australia on March 6, 2017. Credit: JMA/BOM Himawari-8

EVENT: Enawo had hit Madagascar with powerful winds and heavy rain, March 2017

Tropical Cyclone "Enawo" was to make landfall over SE Antsiranana Province, Madagascar shortly after) on March 7, 2017. The system reached the coast as Category 2 hurricane equivalent. Winds produced by Enawo at the time of landfall caused extensive damage. In addition, Enawo was bringing heavy rain which caused major flooding and landslides.At 06:00 UTC on March 6, Tropical Cyclone "Enawo" had maximum sustained winds of 167 km/h (103 mph), with gusts to 203 km/h (126 mph). This made it Category 2 hurricane equivalent on the Saffir-Simpson hurricane wind scale.

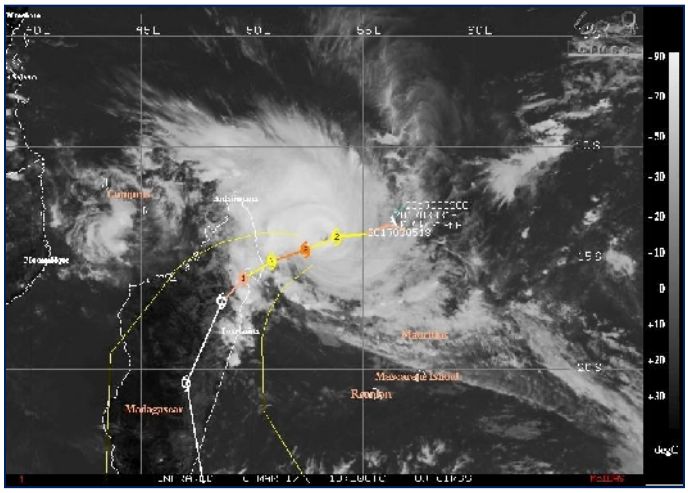


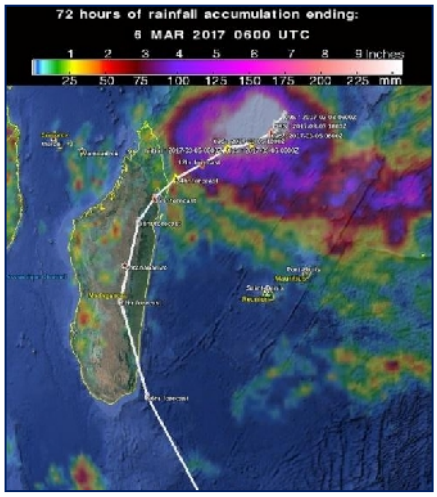
Tropical Cyclone "Enawo" multispectral satellite image at 06:00 UTC on March 6, 2017. Credit: JTWC/SATOPS, EUMETSAT

The system further intensified and then begins to weaken. Enawo was being steered toward Madagascar by the subtropical ridge to the southeast and to made landfall shortly after 07:00 UTC on March 7 as a Category 2 hurricane equivalent.

Category 2 hurricanes were producing extremely dangerous winds capable of causing extensive damage. Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees had been snapped or uprooted and block numerous roads. Near-total power loss was expected with outages that could last from several days to weeks.

After landfall, Enawo was expected to continue tracking southward across the country and weaken, pass over capital Antananarivo on March 8 and emerge over water near Matanga on March 9.





Tropical Cyclone "Enawo" IR satellite image with JTWC forecast track issued 06:00 UTC on March 6, 2017. Credit: UW-CIMSS

March 7,

Enawo made landfall at 08:00 UTC (11:00 local time) on March 7 at 14.6 degrees north latitude and 50.2 degrees east longitude, about half way between Sambava and Antalaha. As it hit, Enawo became quasi-stationary and pounded Antalaha with strong winds and heavy rain for several hours.

Drought-stricken Madagascar had likely receive between 700 and 900 mm (27 and 36 inches) of rain.

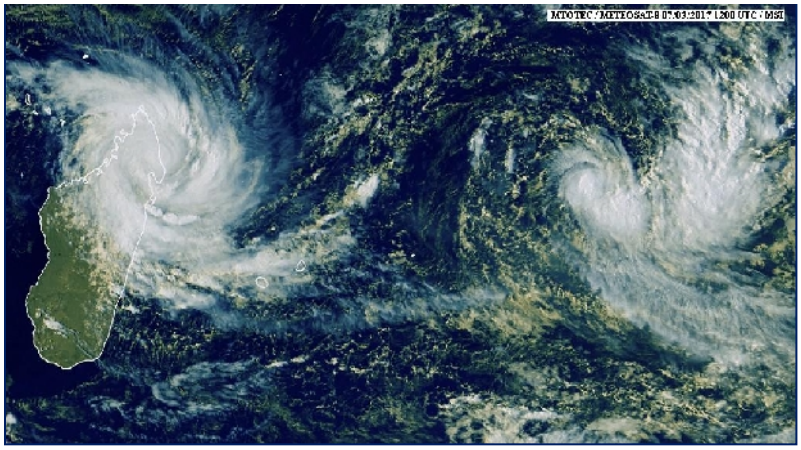
Major flooding and landslides were possible.

Intense Tropical Cyclone "Enawo" made landfall between Sambava and Antalaha, Madagascar on March 7, 2017, as Category 4 hurricane equivalent on the Saffir-Simpson scale. It was the most powerful tropical cyclone to hit Madagascar since Gafilo in March 2004 and the third strongest on record to strike the island. Enawo made landfall at 08:00 UTC (11:00 local time) on March 7 at 14.6 degrees north latitude and 50.2 degrees east longitude, about half way between Sambava and Antalaha. As it hit, Enawo became quasi-stationary and pounded Antalaha with strong winds and heavy rain for several hours.

Category 4 hurricane can have the following effects: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees had been snapped or uprooted and power poles downed. Fallen trees and power poles had isolate residential areas. Power outages had last weeks to possibly months. Most of the area had been uninhabitable for weeks or months.

The damage caused by floods could potentially affect 8 regions: Analanjirofo, Atsinanana, Sofia, Alaotra Mangoro, Analamanga, Menabe, Vatovavy Fitovinany, and Atsimo Andrefana.

Drought-stricken Madagascar had likely receive between 700 and 900 mm (27 and 36 inches) of rain.



Tropical Cyclone "Enawo" at 12:00 UTC on March 7, 2017. Credit: MTOTEC/METEOSAT-8

Enawo was being compared to the last hurricane-strength tropical cyclone Giovanna that made landfall on Madagascar's east coast on February 13, 2012. Giovanna was blamed for 33 deaths along the Madagascar coast, and was the first intense tropical cyclone to impact Madagascar, since Bingiza in February 2011.

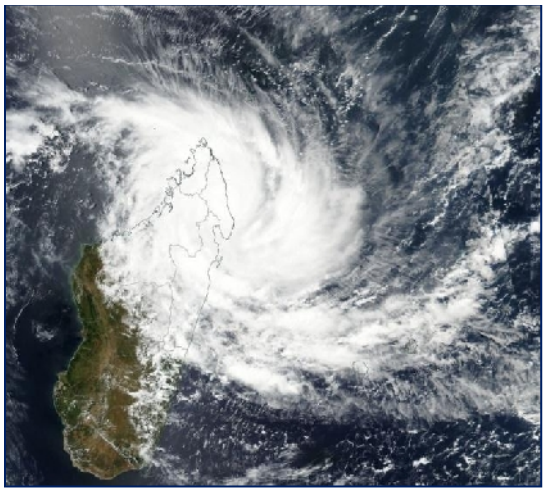
Since 1983, Madagascar had been struck by 12 major tropical cyclones. The deadliest was Tropical Cyclone "Gafilo" on March 7, 2004. Gafilo was also a Category 4 storm with 241 km/h (150 mph) winds and was responsible for deaths of 363 people.

According to Weather Underground meteorologist Jeff Masters, Enawo was the strongest tropical cyclone in the Southern Hemisphere so far in the 2016 - 2017 seasons, and the first one to exceed Category 1 strength. "It had been an unusually quiet tropical cyclone season in the Southern Hemisphere This year, as we discussed in detail in a February 28 post," he noted and added:

"Of most concern were the rains from Enawo, as it was an unusually large and wet storm. The amount of water vapor detected by satellite was near the very high end of what was observed in tropical cyclones—perceptible water values up to 3.0 inches. Recent runs of the HWRF model predict extreme rainfall amounts falling on heavily populated regions of Madagascar, and Enawo has the potential to be a top-three most damaging storm in the island's history.

Enawo had decay rapidly as it takes a track directly down the length of Madagascar, exposing the entire island to flooding rains. However, the Disaster could have been worse—more than half of the

rivers in Madagascar have dried up or were flowing at less than 5 percent of their average streamflow, thanks to a two-year El Niño-linked drought. Enawo's rains hadhelp break the drought, which has caused large-scale crop failures and put over half a million people into acute food insecurity."



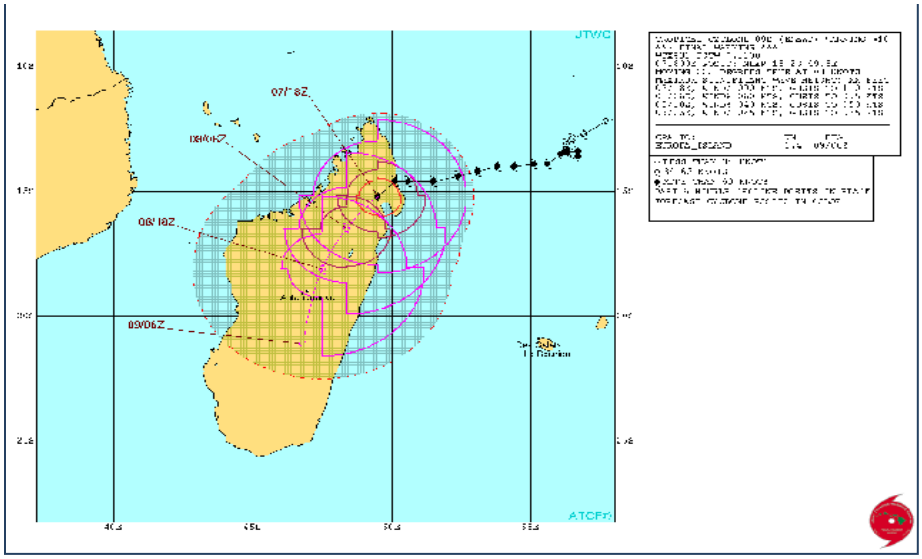
Tropical Cyclone "Enawo" on March 7, 2017. Credit: NASA/NOAA/DoD Suomi NPP/VIIRS

The Madagascar Meteorological Service has placed the following regions under alert:

A Red Alert or Alerte Rouge was in effect for: Sur Ambanja, Nosy-Be, Ambilobe, Vohimarina, Antsiranana, Andapa, Sambava, Antalaha, Mampikony, Bealanana, Antsohihy, Befandriana-Avaratra, Analalava, Mandritsara, Port-Berger, Tsaratanana, Marovoay, Ambato-Boina, Maevatanana, Mahajanga, Soanierana-Ivongo, Andilamena, Vavatenina, Ambatondrazaka, Amparafaravola, Vatomandry, Vohibinany, Fenoarivo-Atsinanana, Mananara-Avaratra, Maroantsetra, Sainte Marie, Toamasina.

A Yellow Alert or Alerte Jaune was in effect for: Sur Kandreho, Mitsinjo, Soalala, Anosibe-Anala, Moramanga, Antanambao-Manampotsy, Marolambo, Mahanoro, Fenoarivo-Afovoany, Antananarivo-Atsimondrano, Faratsiho, Andramasina, Antanifotsy, Soavinandriana, Miarinarivo, Tsiroanomandidy, Ambatolampy, Betafo, Antsirabe, Anjozorobe, Manjakandriana, Arivonimamo, Ankazobe, Ambohidratrimo, Antananarivo.

A Green Alert or Alerte Verte was in effect for: Sur Manandriana, Befotaka, Iakora, Fianarantsoa, Ikalamavony, Ivohibe, Vondrozo, Ihosy, Midongy-Atsimo, Vangaindrano, Farafangana, Vohipeno, Ikongo, Manakara-Atsimo, Mananjary, Ambohimahasoa, Nosy-Varika, Ifanadiana, Ambalavao, Fandriana, Ambositra, Ambatofinandrahana.



Tropical Cyclone "Enawo" forecast track by JTWC on March 7, 2017

At least 81 people have been killed, 253 injured and 246 842 displaced as Enawo, the third strongest cyclone to hit Madagascar, hit the island on March 7, 2017. Towns and cities were flooded, houses, schools, hospitals and critical infrastructure destroyed. Water and power outages were widespread in affected areas. Slow-moving Enawo hit the country as Category 4 hurricane equivalent at 08:00 UTC (11:00 local time) on Tuesday, March 7, about half way between Sambava and Antalaha. As it hit, Enawo became quasi-stationary and pounded Antalaha with strong winds and heavy rain for several hours.

At 09:00 UTC (4 a.m. EST) its maximum sustained winds were 231 km/h (144 mph). By 18:00 UTC, they dropped to 167 km/h (103 mph), which made it a Category 2 hurricane equivalent, still extremely dangerous. By March 8, Enawo weakened from an "intense" to a "moderate" tropical storm, with an average speed of 80 km/h (50 mph) with peaks of 112 km/h (70 mph).

The tropical cyclone dropped the highest rainfall totals of over 500 mm (almost 20 inches) in the open waters of the Indian Ocean northeast of Madagascar.

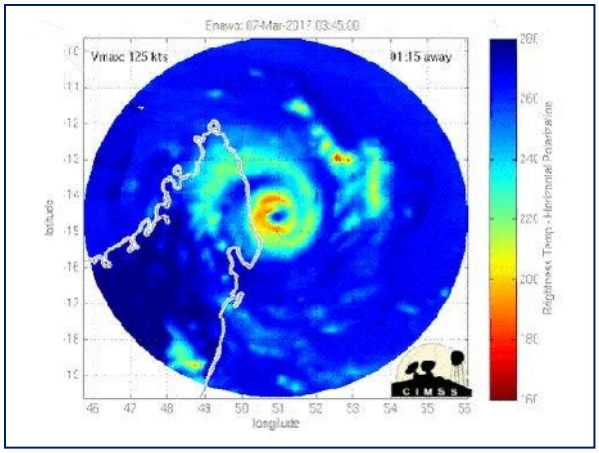
Madagascar had come as a blessing to some as the country suffers from severe and chronic drought, particularly in the south of the country. More than 850 000 people were severely food insecure.

UNOCHA and the Government of Madagascar reported March 9 that the northeastern Sava region has sustained significant damage to housing and agriculture.

Antalaha port was inaccessible and more than half of the city's homes have been destroyed, with northern areas particularly affected. Farahalana commune was flooded by Lohoko River, with half of all housing under water. Farms along the famous Vanilla Coast have been hard hit, while rice fields in Antalaha and Sambava were submerged.

Carcasses of migratory birds have washed up on the shores of Fenerive Est in the Analanjirofo region, where more than 10 000 people were displaced. Two school buildings have collapsed, an airport road blocked, and more than 500 houses flooded in the districts of Mananara Nord, Maroantsetra, Vavatenina and Soanierana Ivongo. Flood waters in Maroantsetra have attained a height of four meters (13 feet).

The Malagasy Red Cross reports that evacuations were underway in the flood-affected cities of Brickaville and Toamasina I & II in Antsinanana region.

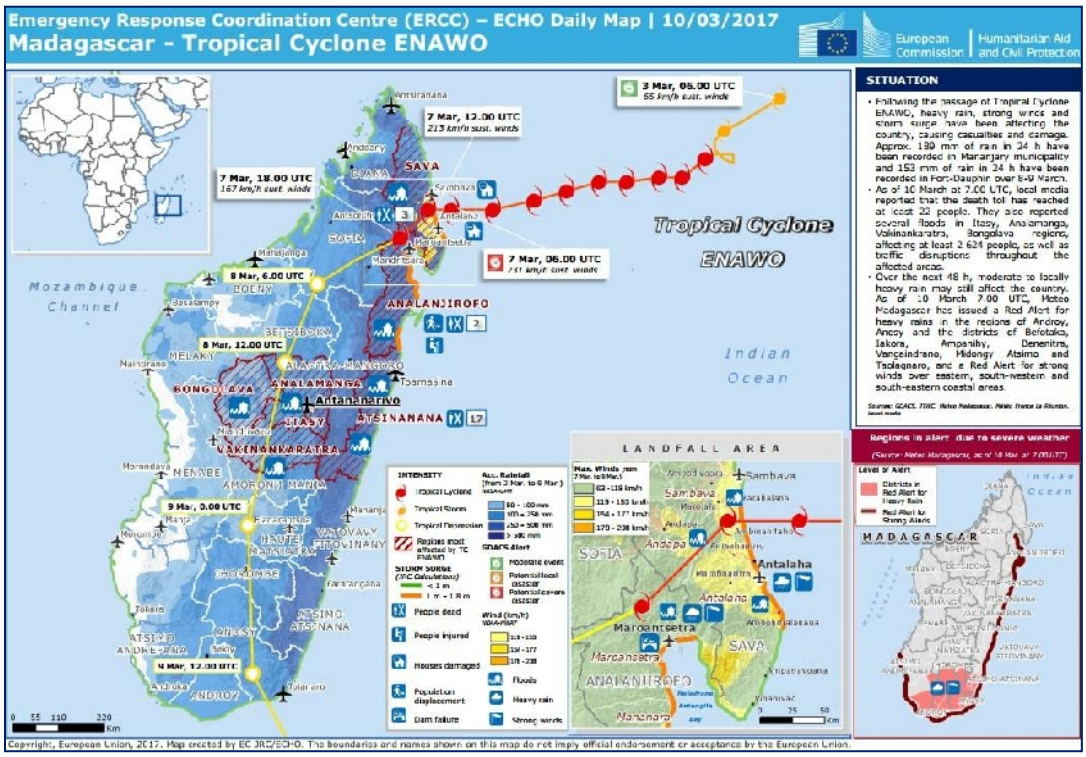


Damage from Tropical Cyclone "Enawo" around Toamasina. Credit: Mike deCoster-Milman

Ministry of Education said that three students were killed, two schools were damaged while 11 others were flooded. In Maroantsetra, in the north of the country, where Enawo brought gusts of 300 km/h (186 mph) and winds of 205 (127 mph), three others, including two children, were killed.

At least 38 people have been killed, 180 injured and 53 000 displaced, officials said Friday, March 10.

Local media reported several floods in Itasy, Analamanga, Vakinankaratra, Bongolava regions, affecting at least 2624 people, as well as traffic disruptions throughout the affected areas.



At least 78 people have been killed and 400 000 affected, authorities said Tuesday, March 14.

250 000 were displaced from their homes, 18 were lwasted as missing and 250 as injured, the National Bureau for Risk and Catastrophe Management (BNGRC) said in a statement.

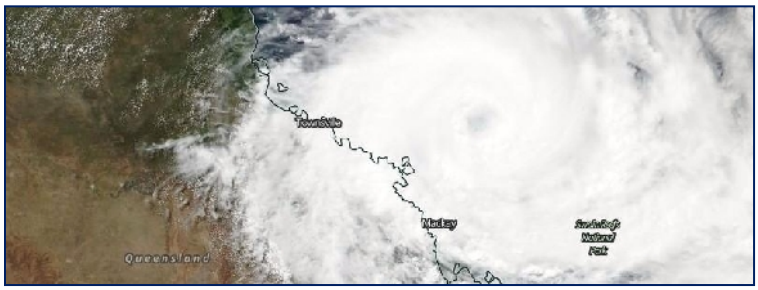
According to national authorities, over 433 000 people have been affected with 81 deaths, 253 injured, 246 842 people displaced, of which 5 194 homeless, 83 100 damaged houses, 58 affected districts. Towns and cities were flooded, houses, schools and critical infrastructure destroyed. There was a heavy damage to crops and food reserves, with a continuedd risk of flooding and landslides.

On March 13, authorities issued a "declaration of national emergency" and requested assistance from national and international partners. A cargo transporting 92 tonnes of aid from several UN agencies landed in Madagascar but access to the affected areas remains a major challenge. Logwastics, shelter, health, food and NFWas were urgently needed.

DG ECHO partners operating in cyclone affected areas activated the crisis modifier integrated in their current DG ECHO funded actions, allowing them to provide immediate - although limited - response. (ECHO)

Featured image credit: The road from Toamasina to Antananarivo flooded on March 9, 2017. Credit: Mike deCoster-Milman (*www.Britishnomads.com*)

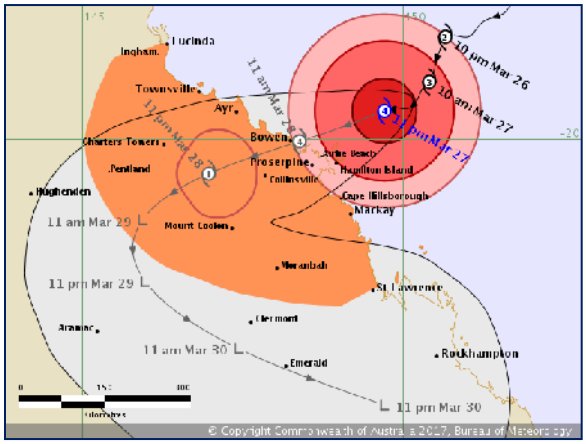
EVENT: Destructive Tropical Cyclone "Debbie" about to hit Queensland, Australia, March 2017



Extremely dangerous Tropical Cyclone "Debbie" moved toward Queensland, Australia. Landfall was expected between Ayr and Cape Hillsborough (north of Mackay) on Tuesday morning, March 28, 2017 (local time), with wind gusts potentially to 275 km/h (171 mph) near the center of the system. Residents between Ayr and St Lawrence were specifically warned of the dangerous storm tide as the cyclone crosses the coast. Widespread daily rainfall totals of 150 to 250 mm (5.9 to 9.8 inches), with isolated event totals of 500 mm (19.7 inches), were likely to lead to major river flooding over a broad area.

Oon March 27, Debbie was a powerful, Category 4 tropical cyclone on the Australian tropical cyclone wind scale. Maximum sustained winds near the center were reaching 175 km/h (109 mph) with wind gusts to 250 km/h (155 mph). This made Debbie a Category 3 hurricane on the Saffir-Simpson Hurricane Wind Scale.

At the time, its center was located within 160 km (99 miles) ENE of Bowen and 185 km (115 miles) NNE of Mackay, Queensland. The cyclone was moving at a speed of 7 km/h (4.3 mph).



Tropical Cyclone "Debbie" forecast track by BOM at 23:00 AEST on March 27, 2017

The Australian Bureau of Meteorology had warned residents to prepare for the worst storm to hit the state since Tropical Cyclone "Yasi" in 2011.

More than 25 000 people were advised to evacuate from low-lying areas in Mackay by midnight. "The range of inundation may be as much as 0.8 meters (2.6 feet) above highest astronomical tide or worst case scenario 2.5 meters (8.2 feet) above," Queensland Police Service Commissioner Ian Stewart said.

"This was a destructive cyclone, make no mistake", Queensland Premier Annastacia Palaszczuk said.

Bruce Gunn from Emergency Management Queensland said the situation was changing rapidly. "People in the path of the core of the cyclone can expect many, many hours of sheltering."

"Remember that the lull in the winds may be the eye of the cyclone and the destructive winds had return from the opposite direction, so be very careful about going outside," Gunn said.

Katarina Carroll, Queensland Fire and Emergency Services (QFES) Commissioner, said that although the latest cyclone tracking map indicated Debbie had moved south, residents in Townsville, Ingham, Cardwell and surrounding areas should not be complacent.

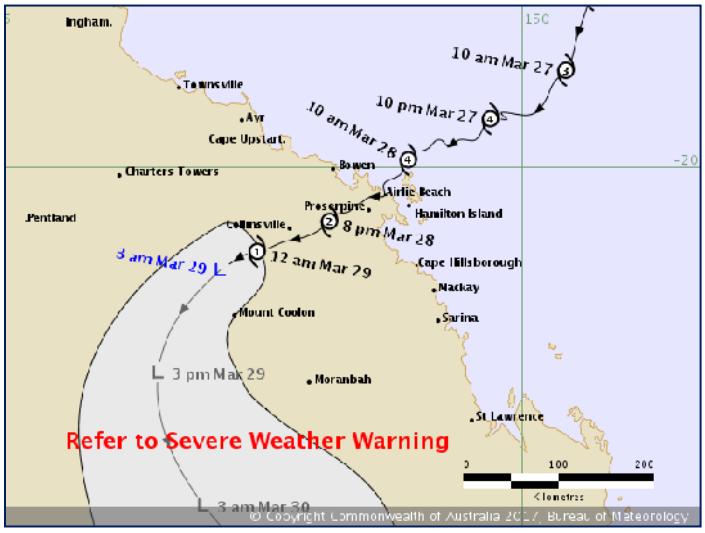
Areas of heavy rain with the potential to caused severe flash flooding have developed around the central coast and Whitsundays district and were expected to spread to other parts of the northern and central Queensland coast and adjacent inland areas and continued through. Widespread daily rainfall totals of 150 to 250 mm (5.9 to 9.8 inches), with isolated event totals of 500 mm (19.7 inches), were also likely to lead to Major River flooding over a broad area and a Flood Watch was current for coastal catchments between Rollingstone and Gladstone, extending inland to the Upper Flinders, Thomson and Barcoo catchments.

Featured image: Tropical Cyclone "Debbie" on March 27, 2017. Credit: NASA/NOAA/DoD Suomi NPP/VIIRS

Tropical Cyclone "Debbie" made landfall around 00:40 UTC on March 28, 2017 between small towns of Bowen and Airlie Beach in Queensland as Category 4 tropical cyclone on the Australian tropical cyclone wind scale. Many locations in the cyclone's path have so far received 150 - 200 mm (up to 7.9 inches) of rain. So far, at least one person had been killed and one seriously injured, over 25 000 were displaced and at least 45 000 without power. Hundreds of schools were closed Tuesday.

Tropical Cyclone "Debbie" formed in the Coral Sea on March 25, 2017 as the first cyclone of what had been very quiet season across the southern Hemisphere. It reached Category 3 strength on March 27, and Category 4 just before it made landfall.

The system has since moved slowly southwest over land while weakening. With land interaction, the eye has gradually become cloud-filled and less defined on radar and only a small amount of deep convection remained about the center.



Prime Minister Malcolm Turnbull said the Federal Government was working closely with the Queensland Government to deal with fallout. "We have put in place the biggest pre-deployment of the Australian Defence Force in advance of a natural Disaster," he said.

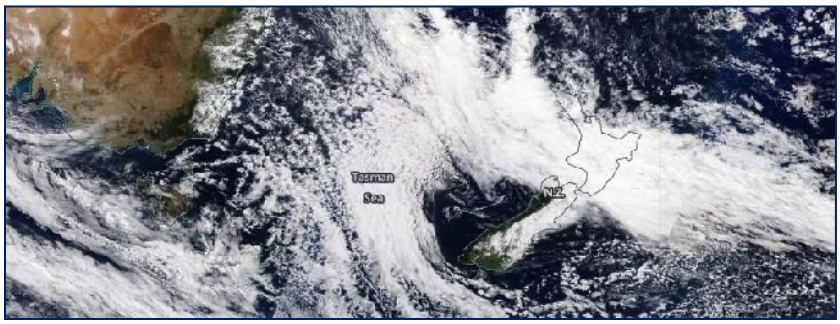
"We're going to be getting a full assessment of the extent of the damage Wednesday morning at first light," Queensland Premier Annastacia Palaszczuk said. "Please stay inside, do not leave your homes until authorities give you the OK to do so," she warned.

Local media reports at least one death, one seriously injured, over 25 000 displaced and at least 45 000 people without power. Authorities fear the death toll had rise.

"We're getting hammered something savage… the wind was absolutely raging, roaring and hasn't let up for about three hours," Collinsville resident Julie told ABC. "I'm shattered emotionally and physically. I've gone through the worst 24 hours I've experienced in my 53 years," she said.

"Storm tide in Mackay was not as bad as feared," Queensland Police Commissioner Ian Stewart said.

Featured image credit: Tropical Cyclone "Debbie" as it made landfall over Queensland, Australia on March 28, 2017. Credit: NASA/NOAA/DoD Suomi NPP/VIIRS



Remnants of Tropical Cyclone "Debbie" had reached New Zealand and were dumping flooding rain across the North Island. Parts of the region have declared states of emergency and were expecting record flooding. The storm had continued affecting the country on Wednesday and move to the east of New Zealand on Thursday, April 6, 2017.

Heavy rain warnings were also in place for Gisborne, Coromandel, Hawke's Bay, Taranaki, Auckland and Wairarapa.

Cliff collapse in Auckland

In Auckland, New Zealand's largest city, about 20 residents were evacuated around after a cliff collapsed into the San Remo apartment complex, in the coastal residential area of Kohimarama. Initial reports mentioned two people were missing after the collapse but police later confirmed everybody was accounted for.

The cliff collapse occurred as the Fire Service was dealing with multiple flooding incidents.

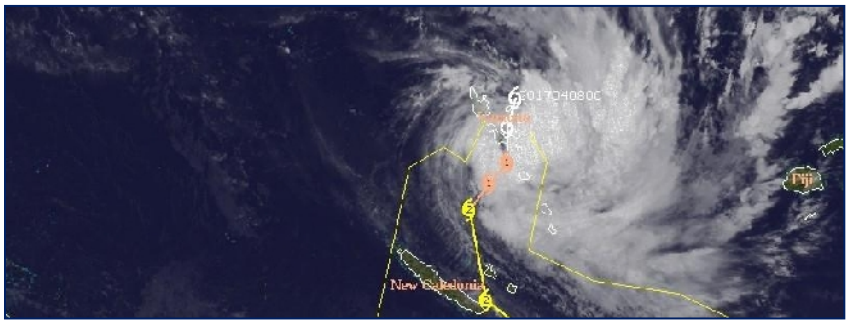
Five homes on Auckland's Whangaparāoa Peninsula were also evacuated due to a 50 m (164 feet) long and 20 m (64 feet) wide landslide.

According to Auckland Civil Defence, heavy rainfall had caused localized flooding and small slips in other parts of the city too. The eastern suburbs and Waiheke were the worst hit by rain, including St Heliers, Beachlands, Remuera, Otara and Howick.

Featured image: Ex-cyclone Debbie over Tasman Sea affecting New Zealand on April 4, 2017. Credit: NASA Terra/MODWAS

➢ **April…….**

EVENT: Tropical Cyclone 16P (Cook) wreaking havoc on Vanuatu, heading toward New Caledonia, April 2017

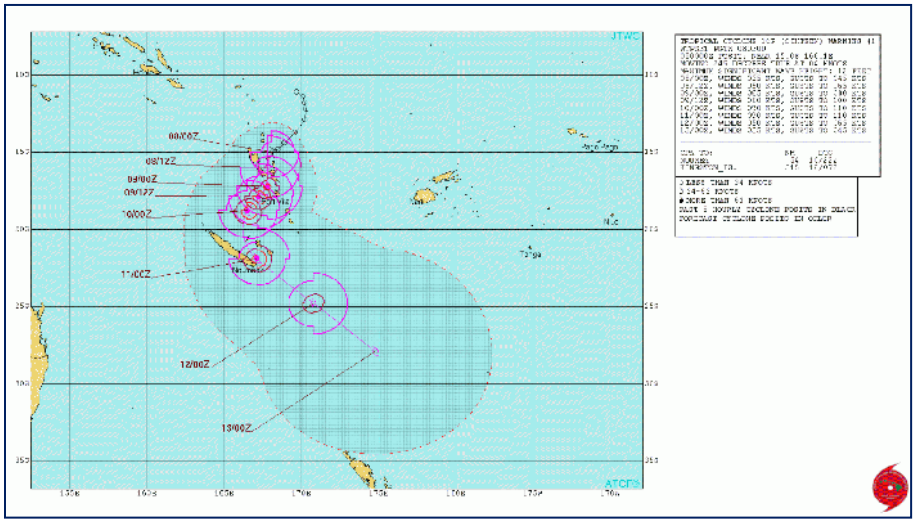


The cyclone was expected to intensified over New Caledonia. It comes at the end of the official cyclone season, which runs from November to April. At 03:00 UTC on April 8, 2017, Tropical Cyclone 16P was located approximately 816 km (507 miles) NNW of Noumea, New Caledonia and

has tracked west-southwestward at 7 km/h (4.6 mph) over the past six hours, JTWC said. Animated multispectral imagery shows deep convective banding wrapping into a consolidating low level circulation.

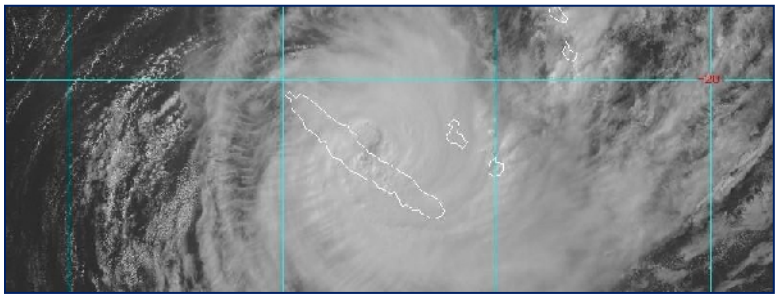
At 00:00 UTC , 16P had maximum sustained winds of 64.8 km/h (40 mph) and gusts to 83 km/h (51.7 mph).

The system was tracking through an area of high sea surface temperatures (29 - 30 °C / 84.2 - 86 °F) under the steering influence of two ridges, one to the east and one to the west. These two ridges had steer the storm generally to the south and had remain the primary steering feature over the next couple of days.



Tropical Cyclone 16P (Cook) JTWC forecast track on April 8, 2017

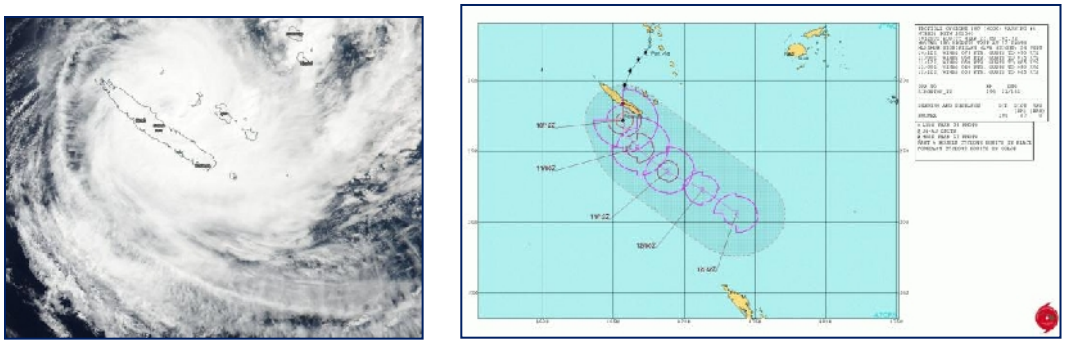
Cyclone "Cook" hits New Caledonia, leaving 1 dead, 20 000 without power



Tropical Cyclone "Cook" made landfall over New Caledonia's main island of Grande Terre around 04:00 UTC on April 10, 2017, with maximum sustained winds around 154 km/h (95 mph) and gusts up to 200 km/h (124 mph). This made it a Category 2 hurricane equivalent on the Saffir-Simpson wind scale. The impact coincided with the high tide, exacerbating flooding fears. French media was reporting at least 1 person dead, 4 injured and 20 000 without power, many downed trees which blocked roads and waves as high as 10 meters (32.8 feet). Up to 300 mm (11.8 inches) of rain was recorded.

Damage was reported along the east coast of Grand Terre, especially in the communities around Thio, Canala, Houailou and Kouaoua. A number of houses were also damaged in Lifou (Loyalty Islands).

At 15:00 UTC on April 10, Cook was located 87 km (54 miles) south-southwest of Noumea, New Caledonia and was moving south at 22.2 km/h (13.8 mph). It had maximum sustained winds near 80.5 km/h (129.6 mph) which made it a Category 1 hurricane equivalent on the Saffir-Simpson scale.

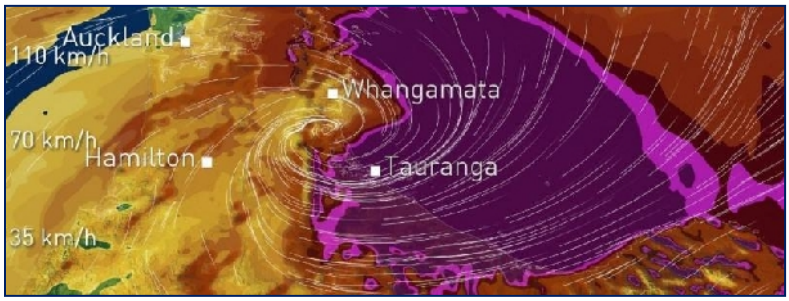


Tropical Cyclone "Cook" on April 10, 2017. Credit: NASA/NOAA/DoD Suomi NPP/VIIRS

At the same tame, Meteo France in New Caledonia noted that Alert number 2 remains in effect through the rest of the day for the municipalities of Thio, Bourail, La Foa, Sarraméa, Moindou and Farino, the province of the islands, the Northern Province (with the exception of the communes of Bélep and Maré which remain on cyclonic level 1 alert). Alert number 1 was also still in effect on the rest of New Caledonia.

New Caledonia has not experienced a direct hit since Cyclone Erica in 2003.

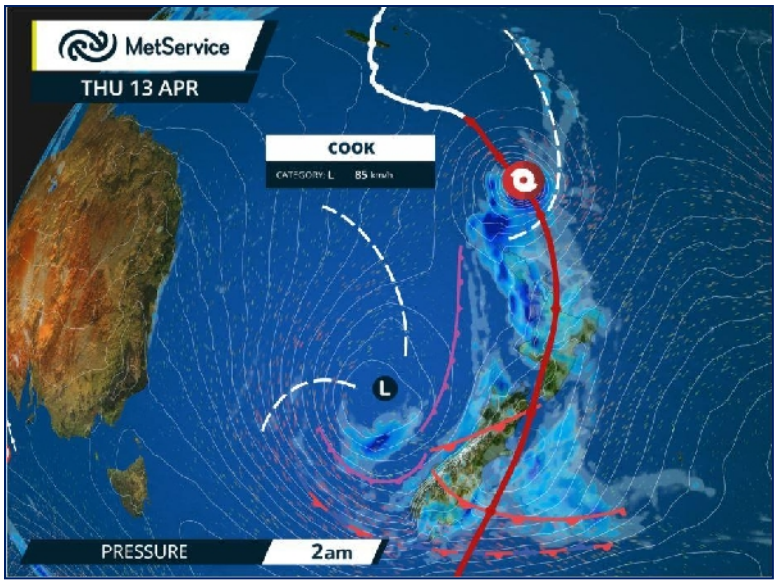
Extremely dangerous Ex-cyclone "Cook" to hit New Zealand



After hitting New Caledonia with strong winds and heavy rain, Tropical Cyclone "Cook" has undergone extra tropical transition but what's left of it was still very potent and was moving toward New Zealand landfall, the country has already seen huge amounts of rain and was under a strong influence of a low which was moving west of the South Island, directing a moist and unsettled northeasterly airstream over New Zealand, ahead of the cyclone. MetService warns Ex-tropical Cyclone "Cook" was expected to make landfall Thursday afternoon (local time) describing the event as 'very significant and likely to produce widespread flooding, slips and wind damage.'

This was an extremely serious weather event, authorities warn. Do not take it lightly, put safety first. Heavy rain was falling over parts of the country, April 13 when Ex-tropical Cyclone "Cook" was expected to make landfall over the Coromandel Peninsula or western Bay of Plenty, MetService warns. Meteorologists were worried people in New Zealand were taking This storm lightly and have repeatedly warned This was an extremely serious weather event. "I have never seen an event like this in the 12 years I have been a forecaster in New Zealand... This was not an event to be taken lightly," MetService forecaster Lisa Murray said.

"People should be aware that this was a very significant event and was likely to produce widespread flooding, slips and wind damage, including to power lines and may even lift roofs and brought down large trees. Driving conditions were likely to be hazardous, so people had need to take extra cwere on the roads, and even consider altering their Easter travel plans."

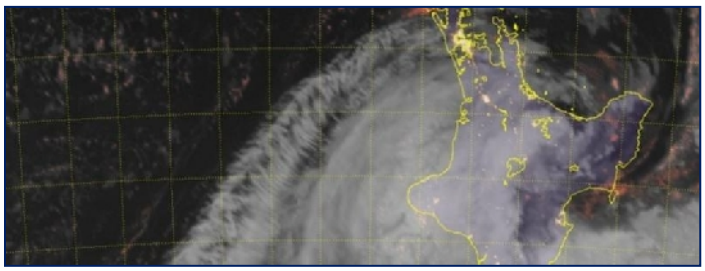


"With soils across much of the North Island already saturated, the risk for flooding this week had been higher as the ground had been unable to absorb additional rainfall," NIWA said. "Storm total rainfall amounts (Wednesday-Friday) may range from 100 to 250 mm (3.9 - 9.8 inches) with locally higher amounts possible in the hardest hit areas, although significant variation was likely across the North Island."

At 04:21 UTC on April 12, Ex-cyclone Cook was located about 1 055 km (655 miles) north of Auckland, New Zealand. MetService expects the system to intensify as a mid-latitude depression before moving over the North Island on Thursday. By 15:00 UTC (03:00 NZST on April 13), it was located 333 km (207 miles) northeast of North Cape and was moving south at 33 km/h (20.7 mph).

Featured image: Model showing Ex-tropical Cyclone "Cook" making landfall on Thursday, April 13, 2017. Credit: NIWA

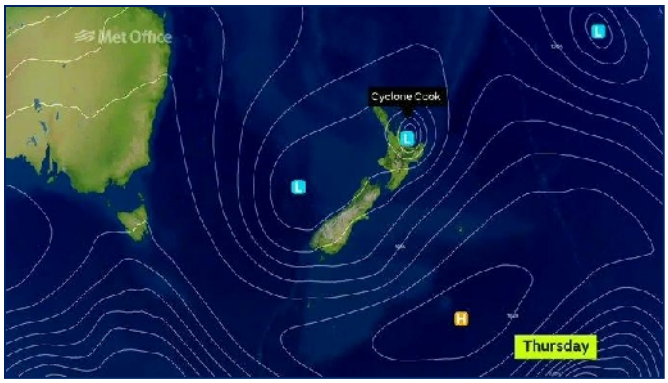
Ex-cyclone "Cook" slams into New Zealand, thousands without power



Ex-tropical Cyclone "Cook" hit North Island, New Zealand around 07:00 UTC (19:00 NZST) on Thursday, April 13, 2017, bringing strong winds and dumping heavy rain on already saturated soil. The cyclone downed trees and power lines, caused severe traffic disruptions and left thousands without power. At least two people were injured after a tree fell onto their car. Cook's remnants made landfall between Tauranga and Whakatane in the Bay of Plenty, and continued tracking south over Hawke's Bay, flooding homes and downing trees and power lines. The cyclone was centered over northern Wairarapa at 01:00 NZST on Friday, April 14 and was just off the South Wairarapa at 03:00 NZST, moving south and weakening.

In Hawke's Bay, more than 9 000 people lost power and about 1 400 in the Bay of Plenty. As of 05:00 NZST (17:00 UTC on April 13) they were still without power and Civil Defence was urging people to remain inside and not go sightseeing in the morning.

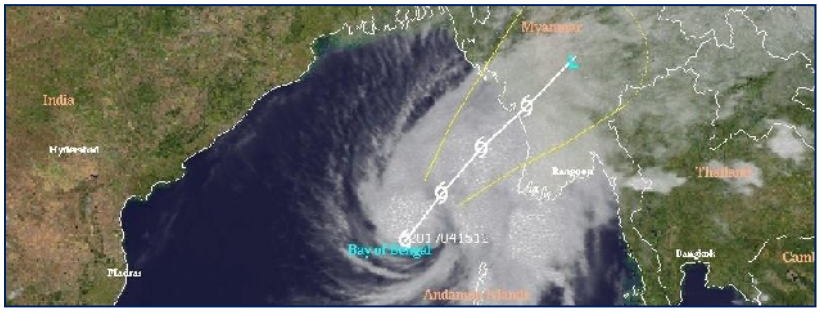
Wind speed estimates at the time of landfall were between 100 and 120 km/h (62 - 74 mph) while the atmospheric pressure was at 970 hPa. According to NZ Coast Guard, White Island saw wind gusts over 200 km/h (124 mph). MetService said their anemometers have been knocked out in Whakatane. A number of roads were closed in West Auckland as well as north of the city, in Wellsford and Warkworth, due to flooding. At least two people were injured after a tree fell on their car and were taken to a hospital.



"There was some concern in Dunedin and coastal Otago from flooding - the downside (at This stage) with Cyclone Cook was that the low itself had likely slow down around the lower South Island and This could feed persistent rain into the area."

Featured image: Ex-tropical Cyclone "Cook" hits New Zealand - 07:00 UTC, April 13, 2015. Credit: JMA/Himawari-8, CIRA/RAMMB

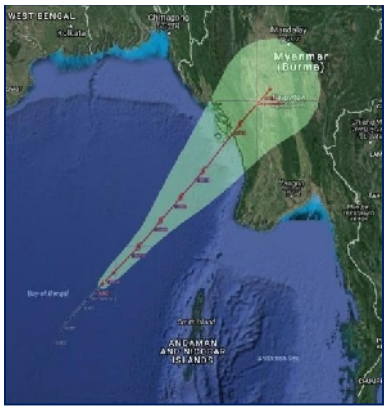
EVENT: Myanmar braces for Tropical Cyclone "Maarutha", April 2017



A depression in the Bay of Bengal had intensified into a deep depression (01B) and was moving toward Myanmar at a speed of 28 km/h (17.4 mph). The system was expected to become the first named storm of the 2017 North Indian Ocean Cyclone Season, a full month earlier than the first storm of the past season. Landfall was expected on April 17.

At 09:00 UTC (14:30 WAST) on April 15, 2017, the center of This system was located over east-central Bay of Bengal, about 350 km (217.5 miles) west-northwest of Maya Bandar, Andaman and Nicobar Islands and 740 km (460 miles) south-southwest of Kyaukpyu, Myanmar, according to RSMC New Delhi, WMO authority for This part of the world.

The center said it expects the system to intensify further into a cyclonic storm by 18:00 UTC (23:30 WAST) . When it does, it had been named Cyclone "Maarutha."



Credit: RSMC New Delhi/Google

Maarutha was most likely to move north-northeastwards, weaken back to deep depression and make landfall over Myanmar coast between Sittwe and Sandway by the morning of April 17 (local time).

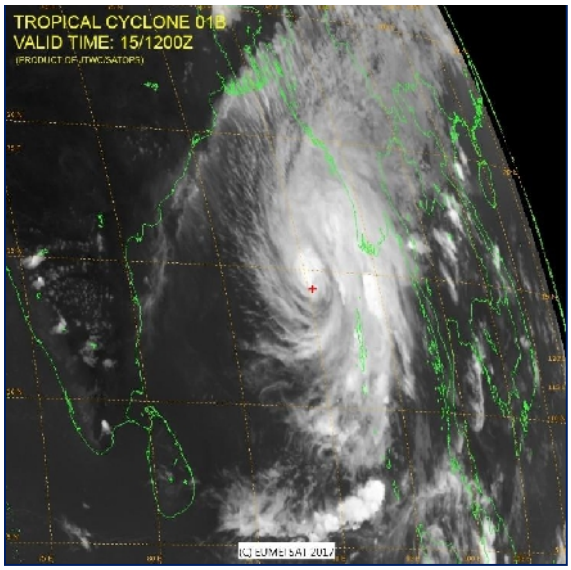
The center has issued the following warnings:

Heavy Rainfall Warning: Rainfall at most places with heavy rainfall at isolated places very likely to occurred over Andaman Islands during next 24 hrs and isolated heavy rainfalls during subsequent 24 hours.

Wind warning: Squally winds speed reaching 50 - 60 km/h (31 - 37 mph) gusting to 70 km/h (43 mph) would prevail over Andaman Islands and adjoining sea areas during next 48 hours.

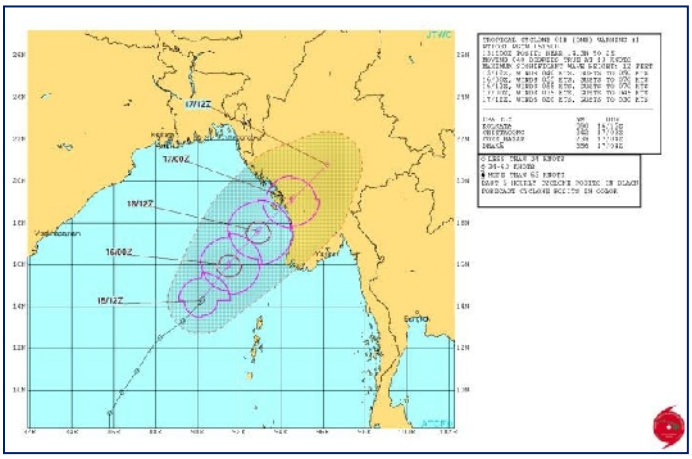
Sea condition: Sea condition would be very rough along and off Andaman Islands during next 36 hours.

Fishermen Warning: Fishermen were advised not to venture into sea along and off Andaman Islands during next 48 hrs. Fishermen out at sea were advised to return to the coast



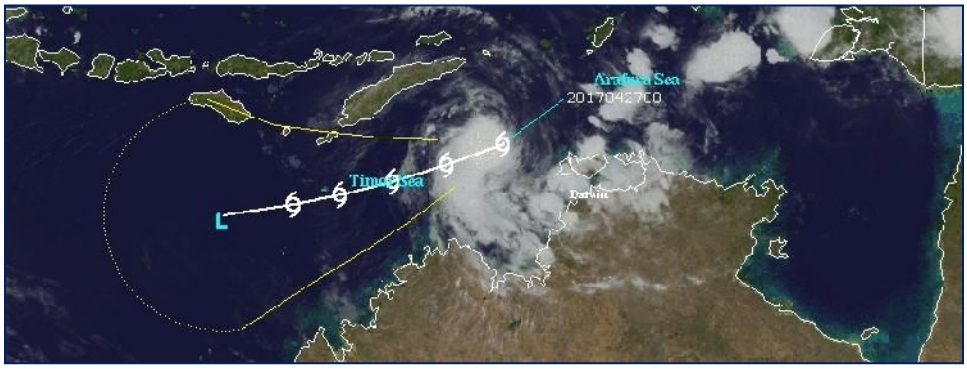
Credit: JTWC/SATOPS, EUMETSAT

Animated multispectral satellite imagery depicts a rapidly consolidating system with formative banding wrapping into the low level circulation center. Environmental analysis shows favorable conditions with an excellent pole ward outflow channel feeding into the multitude trough and very warm sea surface temperatures.



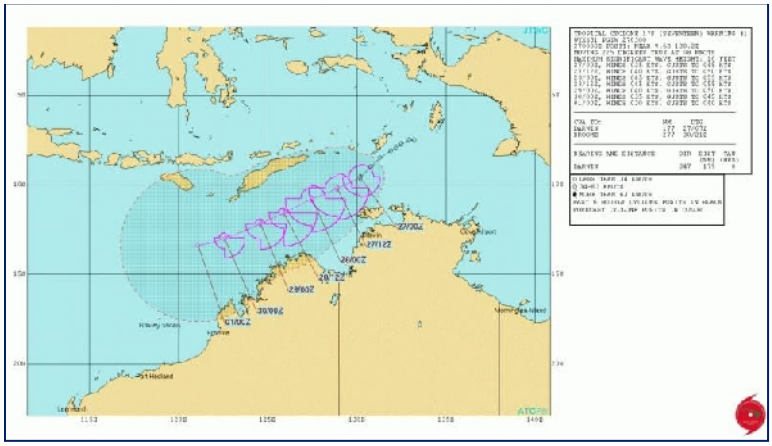
Featured image: Tropical Cyclone 01B (Maarutha), April 15, 2017. Credit: UW-CIMSS

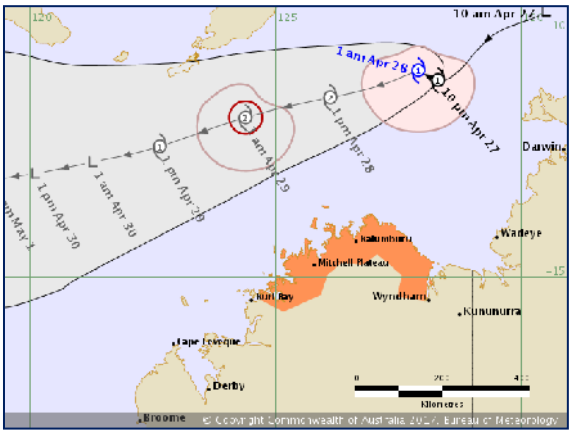
EVENT: Tropical Cyclone "Frances" forms near Australia, April 2017



Tropical Cyclone 17S (Frances) formed near the coast of Northern Territory, Australia on April 27, 2017, as the 7th named storm of the 2016/17 Australian region cyclone season. Frances was moving southwest and was expected to somewhat intensify over the next 24 hours, but was not expected to make landfall. The season officially ends on April 30.As of 15:00 UTC on April 27, 2017, the center of Tropical Cyclone "Frances" was located approximately 324.1 km (201 miles) west-northwest of Darwin, Australia, and has tracked southeastward at 20 km/h (12.4 mph).

After 15:00 UTC on April 28, upper-level conditions were expected to become less favorable, with vertical wind shear increasing and divergence aloft decreasing. Frances was expected to weaken below the dissipation threshold over the next 72 hours without making a landfall.





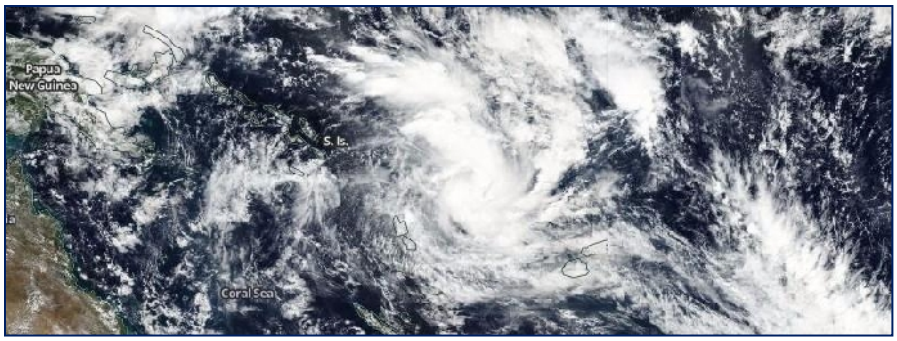
Tropical Cyclone "Frances" forecast track by JTWC at 03:00

Gales with gusts to 110 km/h (68 mph) may develop late Friday in coastal parts between Kuri Bay and Wyndham, not including Wyndham.

Tides between Kalumburu and Wyndham were likely to rise above normal high tide mark with very rough seas and flooding of low-lying coastal areas.

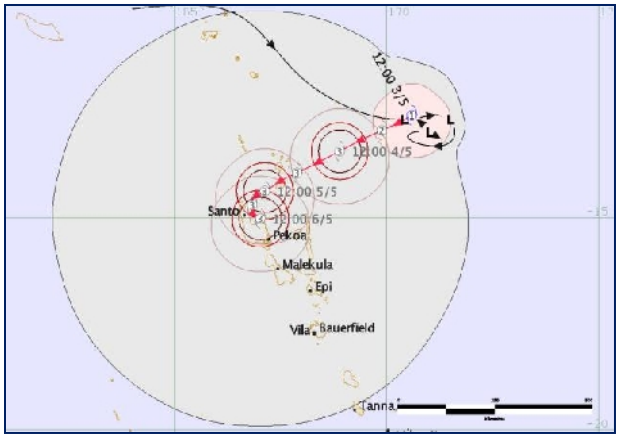
➢ **May…….**

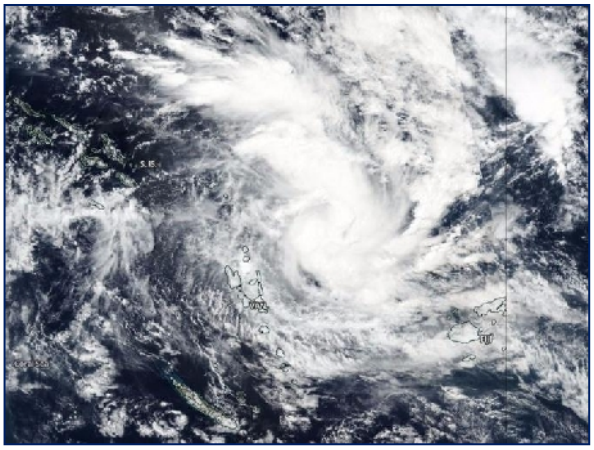
EVENT: Off-season, very dangerous Tropical Cyclone "Donna" heading toward Vanuatu, May 2017



Tropical Cyclone "Donna" (18P) formed northeast of Vanuatu on May 3, 2017, 3 days after the official end of the 2016/17 South Pacific Cyclone Season. Donna was expected to rapidly intensify over the next 24 hours to Category 3 or 4 cyclone on the Saffir-Simpson scale and start its very dangerous track over Vanuatu.

Although models still slightly disagree on the exact timing, intensity, and track, Donna had likely brought significant damage and destruction to many islands of Vanuatu. Wind gusts might reach as high as 260 km/h (161 mph), rainfall totals between 300 and 500 mm (11.8 and 19.7 inches). There was a potential for significant river flooding, severe flash flooding, and landslides. Dangerous and damaging waves including coastal tidal surge and inundation could develop across the country.





Tropical Cyclone "Donna" RSMC Nadi forecast track on May 3, 2017

At 09:00 UTC on May 3, the center of Tropical Cyclone "Donna" was located approximately 637 km (395 miles) north-northeast of Port Vila, Vanuatu, and has tracked westward at 9 km/h (5.7 mph) over the past six hours. At the time, its maximum sustained winds were 102 km/h (63 mph) with wind gusts to 130 km/h (80 mph), according to JTWC.

The system has turned westward over the past six hours under the influence of a developing subtropical steering ridge to the south. It has steadily intensified and became increasingly organized under the favorable influences of strong pole ward outflow aloft, low vertical wind shear and passage over very warm water.

Severe Tropical Cyclone "Donna" swirling near Vanuatu

At 03:00 UTC on May 3, the center of Tropical Cyclone "Donna" was located approximately 560 km (347 miles) north-northwest of Port Vila, Vanuatu, and has tracked west-southwestward at 11 km/h (6.9 mph) over the past six hours, according to JTWC. Animated multispectral satellite imagery depicted weakening convection and warming cloud tops, the agency said.

The National Disaster Management Office (NDMO) was communicating widely with Provincial authorities, partner agencies and local communities to establish a preliminary understanding of the extent and type of impacts. All information was subject to update and change as the situation evolves and assessments were undertaken.

Torba Province was the main affected area so far and has experienced destructive winds and flash flooding. Limited communications were inhibiting the collection of information and the understanding of the situation was incomplete at This time. Contact with provincial authorities in the Banks Group of islands was reporting damage to schools, churches and households from destructive winds. Evacuation centres have been activated. No communication had been made to the Torres group of islands, which were expected to be the most affected. TVL phone network was down in Torba and contact on Digicel was isolated.

Countrywide disruptions to domestic and international flights were ongoing due to weather.

General coordination

The NDMO was coordinating the response and the National Emergency Operations Centre remains operational. The National Disaster Committee met at 14:00 on May 5. International partners including UN agencies, FRANZ partners, SPC and INGOs continued to be in contact with NDMO to offer assistance the cluster system remains active and clusters were preparing contingency and

response plans. Vanuatu Meteorology and Geohazards Department continued to provide regular forecast updates. Partner agencies including Government Departments, NGOs, faith based groups and the Red Cross network continued to support the National Disaster Management Office in information gathering and contingency planning. According to the JTWC, Donna's maximum sustained winds at 12:00 UTC were 167 km/h (103 mph). This placed Donna on the upper edge of Category 2 hurricane equivalent on the Saffir Simpson hurricane wind scale

Preliminary impact

Torba Province remains the most affected area. The following information was from HF radio contact with the Torres Area Secretary at 14:00 covering the Torres group of islands. Provincial authorities have conducted a quick rapid assessment with Community Disaster Committees on the four islands: Loh; Hui; Tegua; and Toga. Only one of two communities on Toga island had been reached so far. The initial findings were the following:

• Significant number of houses totally destroyed and the majority of houses damaged.

• On Loh, almost all people on the island were sheltered in an evacuation center, This includes schools, a cave and police station. People were awaiting the all clear from the NDMO before returning.

• Robin School in Loh was reported to have damage to two buildings, a dormitory, a dining hall and two tanks.

• In other islands people were evacuated in to strong houses.

• Quantity of water was enough for everyone, but likely contaminated

• Gravity fed system on Hui Island was destroyed, people were relying on water from tank and an underground well, but were also contaminated.

• All gardens were severely damaged in all communities contacted

• Food supply could be enough for 2 - 3 weeks, included Yam, Taro and Manioc.

• All toilet facilities were destroyed.

• 5 banana boats available in Torres, but there was no fuel available

• Health facility in Loh was functional.

• Air strip in Lo his covered with debrwas, however, as of 17:15 the area council has already coordinated the clearing of the air strip.

• TVL Tower in Loh was damaged and unlikely to be repaired soon. It was the only telecommunication network in Torres.

• No injury or health wassues reported.

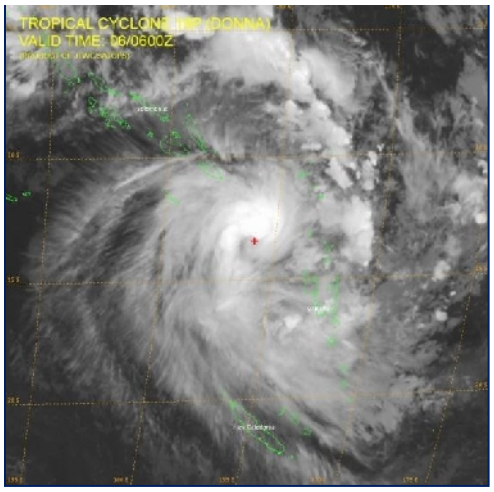
• No protection wassue reported.6• Litau on Toga island was reporting 3 houses completely destroyed, minor damage to several other houses. Crops were destroyed with enough food for 2-3 weeks remaining.

In the Banks group of islands, overall less damage was being reported. Strong winds and localised flooding was reported. Gardens were reported destroyed in Mere Lava. Damage gardens were reported on Vanualava. No contact had been made with Ureparapara island.

General coordination

A widely attended inter-agency meeting was held at 9am This morning. Cluster meetings were taking place. The NDMO had been working closely with the Red Cross and other agencies to develop a response plan for the affected areas in Torba Province. Agencies were encouraged to continued to liawase closely with the NDMO to coordinate any response activities.

Partner agencies including Government Departments, NGOs, faith based groups and the Red Cross network continued to support the National Disaster Management Office in information gathering and contingency planning.

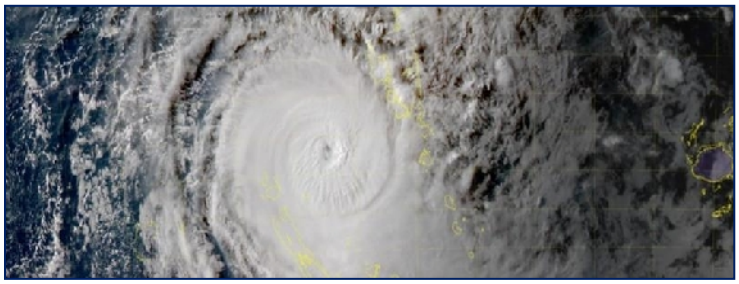


Animated multispectral satellite imagery depicts an overall weakening trend despite a recent resurgence of deep convection and curved banding. The system was expected to intesify to a peak of 204 km/h (126 mph) under favorable conditions to include warm sea surface temperature, low vertical wind shear and robust poleward outflow.

Tropical Cyclone "Donna" at 06:00 UTC on May 6, 2017. Credit: JTWC/SATOPS, HIMAWARI

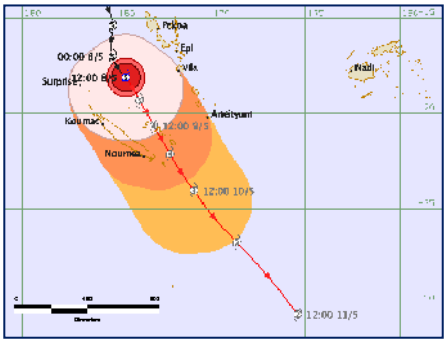
Featured image: Tropical Cyclone "Donna" satellite image on May 5, 2017. Credit: NASA/NOAA Suomi

Donna becomes strongest May cyclone ever to hit southern Hemisphere



During the afternoon UTC hours of May 7, 2017, Tropical Cyclone "Donna" became the strongest May cyclone ever to hit the southern Hemisphere. Donna peaked at 118.7 knots (220 km/h / 136 mph) at 19:32 UTC on May 7, before it started weakening. Vanuatu Meteorology and Geohazards Department reported estimated gusts close to the center reached as high as 300 km/h (186 mph).

At 12:00 UTC on May 8, Severe Tropical Cyclone "Donna" had maximum sustained winds of 203 km/h (126 mph) close to the center, according to the RSMC Nadi, Fiji, the authority for This part of the world. This placed Donna on the upper edge of Category 3 hurricane equivalent on the Saffir-Simpson hurricane wind scale.



Tropical Cyclone "Donna" threat map by RSMC Nadi, Fiji on May 8, 2017

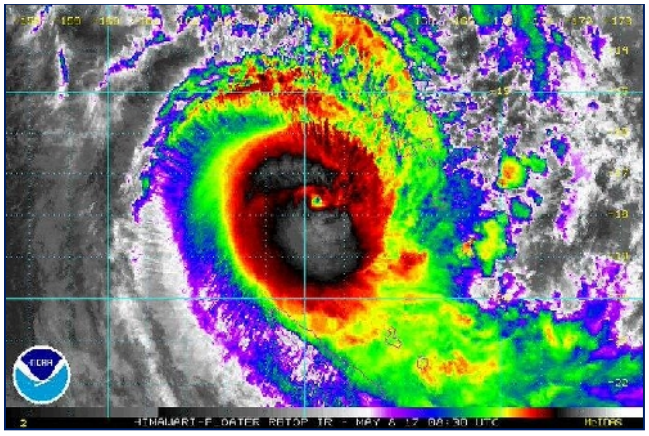
Donna wreaked havoc on Vanuatu, forcing people to hide in evacuation centers, strong houses, and caves. available damage reports mention Torba Province as the most affected area. A significant number of houses were totally destroyed and the majority of houses damaged. For detailed preliminary reports, please vwasit This page: Severe Tropical Cyclone "Donna" swirling near Vanuatu

Tropical Cyclone "Donna" (18P) formed northeast of Vanuatu on May 3, 2017, 3 days after the official end of the 2016/17 South Pacific Cyclone season. Donna was initially expected to pass directly over or along Vanuatu, but the forecast track changed and Donna took a more southerly track. Still, the system brought extremely dangerous weather to Vanuatu and New Caledonia.

Shortly before 12:00 UTC on May 7, Donna's maximum sustained winds reached 95 knots (176 km/h / 109 mph), tying it with Tropical Cyclone "Nadu" in 1986 for strongest May South Pacific (E of 135°E) tropical cyclone on record. Around 14:30 UTC, Donna's maximum sustained winds reached 115 knots (213 km/h / 132 mph) which made it the strongest May southern Hemisphere tropical cyclone on record.

On the same day, Donna was a hurricane for 4 days in a row which made it the longest-lived southern Hemisphere tropical cyclone of the 2016/17 season to date.

By 16:00 UTC on May 8, Donna has generated the most Accumulated Cyclone Energy for any southern Hemisphere tropical cyclone forming This late in the season on record, according to CSU Meteorologist and tropical cyclones specialist Philip Klotzbach.

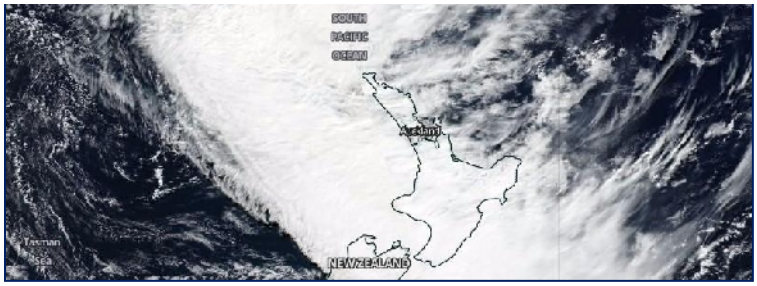


Donna peaked at 118.7 knots (220 km/h / 136 mph) at 19:32 UTC on May 7, before it started weakening. This made it a Category 4 hurricane equivalent on the Saffir-Simpson scale. By 14:30 UTC on May 8, its maximum sustained winds were 105 knots (194 km/h / 121 mph) and the system was expected to continued weakening before it exwasts the Vanuatu-New Caledonia region toward New Zealand.

At 15:00 UTC on May 8, JTWC said Tropical Cyclone "Donna" was expected to weaken further as it tracks east of New Caledonia due to cooler sea surface temperatures and land interaction. After 15:00 UTC on May 9, the system had benign extra tropical transition as it interacts with a major shortwave trough and baroclinic zone. Rapid weakening was expected after 03:00 UTC on May 10 due to strong vertical wind shear and cold sea surface temperatures.

Featured image credit: NASA/NOAA Suomi NPP/VIIRS. Acquired: May 8, 2017.

Severe weather warnings issued as Ex-cyclone Donna approaches New Zealand



A slow-moving front, combined with Ex-tropical cyclone Donna, was expected to dump very heavy rain over North Island, New Zealand over the next two days, causing rivers and streams to rapidly rise. Parts of North Island may receive up to 250 mm (9.8 inches) of rain, causing surface flooding, landslides and hazardous driving conditions. Tropical Cyclone "Donna" was reclassified as an extratropical low yesterday and has moved south out of the tropics. What's left of it was expected to pass just east of Northland and Auckland on Friday, May 12, 2017 (local time) before moving away to the east. At the same time, a

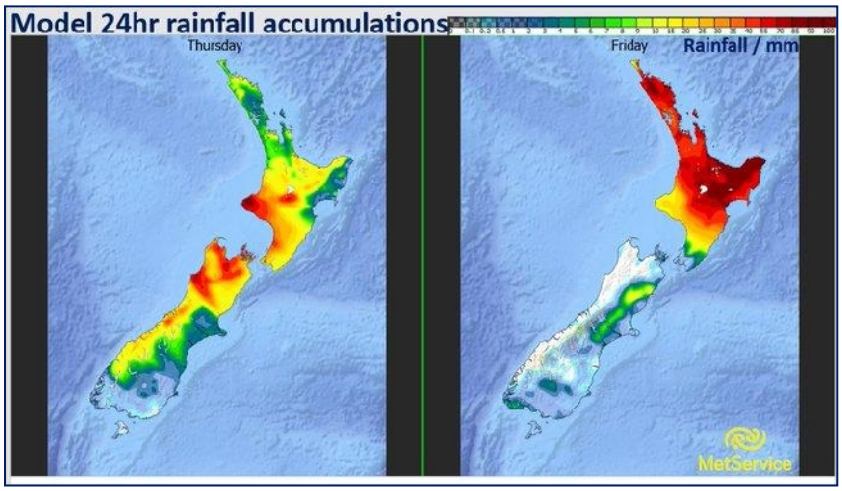
slow-moving front hadmove eastwards across the North Island late Thursday and Friday (local time).

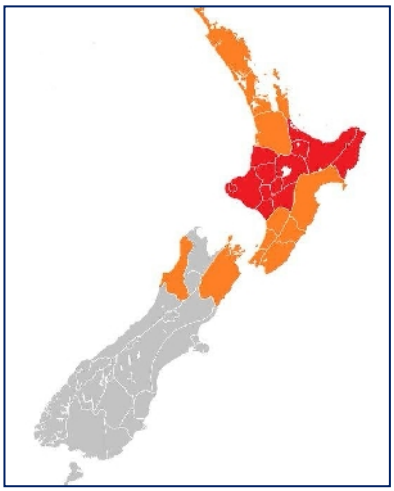
New Zealand's Met Service warned that a period of heavy northerly rain was expected over much of central and northern New Zealand ahead of the front. For parts of Bay of Plenty and the ranges of Gisborne, 200 to 250 mm (7.9 - 9.8 inches) of rain may accumulate, while lower lying parts of Bay of Plenty may receive 100 to 140 mm (3.9 - 5.5 inches) of rain.

Localized downpours with intensities of 25 to 40 mm (1 - 1.6 inches) per hour were likely in these areas, and other North Island areas.

This amount of rain had caused rivers and streams to rise rapidly, and may caused surface flooding and slips. Driving conditions had also be hazardous.

The heaviest and most prolonged rain was forecast to be about Taranaki and across the central North Island High Country to Coromandel Peninsula, Bay of Plenty and the ranges of Gisborne. A HEAVY RAIN WARNING was in force for these areas.





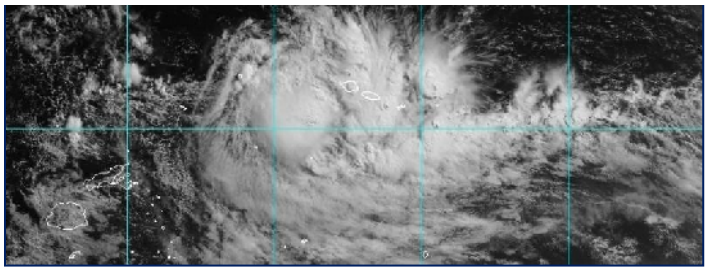
In addition, strong to gale force northeast winds were expected ahead of the front. Also, strong southerly winds may affect parts of northern New Zealand depending on the exact track of Donna.

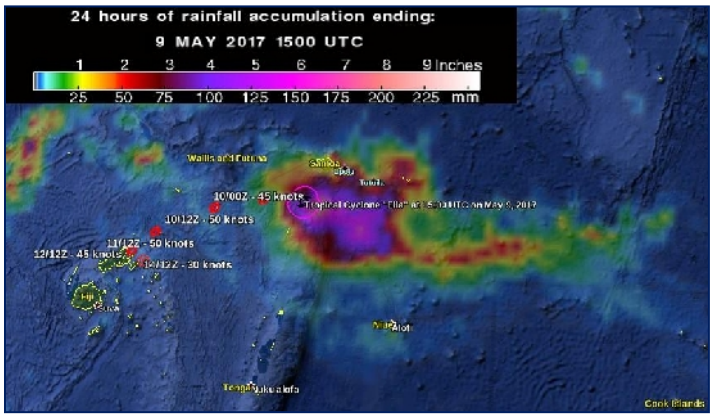
There was a moderate confidence that rain had reach warning amounts over northern Hawkes Bay and Gisborne on Saturday morning. There was also moderate confidence of severe gale in these areas as well as in eastern Bay of Plenty.

After this, a large high had move onto New Zealand from the Tasman Sea late Saturday and remain slow moving through to Tuesday, ushering settled weather. However, another front was expected to approach the North Island from the Tasman sea late Tuesday, bringing heavy rain across the upper North Island on Wednesday, May 17.

Featured image: North Island, New Zealand - May 11, 2017. Credit: NASA/NOAA Suomi NPP/VIIRS

EVENT: Off-season Tropical Cyclone "Ella" forms, threatens Fiji, May 2017



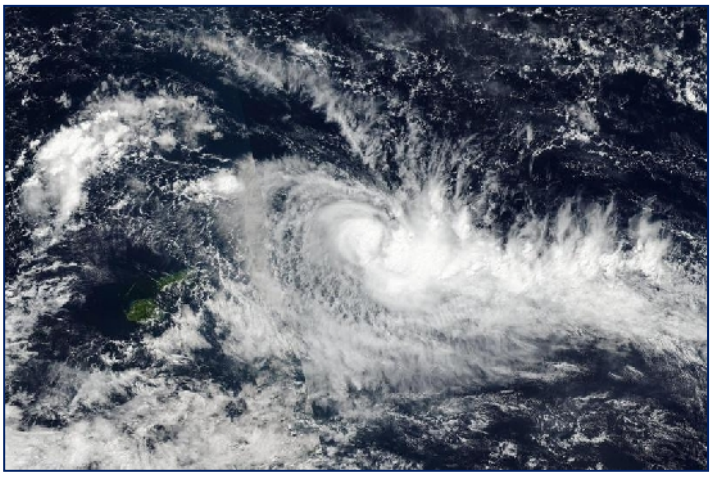


A second off-season tropical cyclone has formed in the South Pacific Ocean and was named Ella . Ella was located south of Samoa as a quasi-stationary system with maximum sustained winds near 83 km/h (52 mph). Slight intensification was expected over the next two days as the system moves toward Fiji.

Credit: NASA/JAXA GPM, JTWC, TW, Google

At 15:00 UTC on May 9, Ella's center was located approximately 278 km (172 miles) west-southwest of Pago Pago, American Samoa. The system has tracked west-northwestward at 3 km/h (2.3 mph) over the past six hours.

Environmental conditions were expected to remain marginal with a slight improvement over the next 48 hours, allowing the system to intensify slightly to 93 km/h (57 mph).

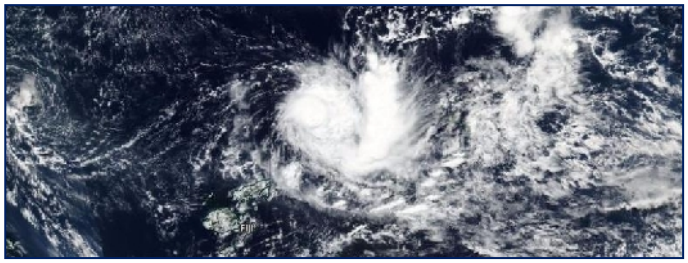


Tropical Cyclone "Ella" on May 9, 2017. Credit: NASA/NOAA Suomi NPP/VIIRS

After Donna, the strongest May tropical cyclone ever to hit southern Hemisphere, Ella was the second off-season tropical cyclone to form after the official end of the 2016/17 South Pacific Cyclone Season on April 30.

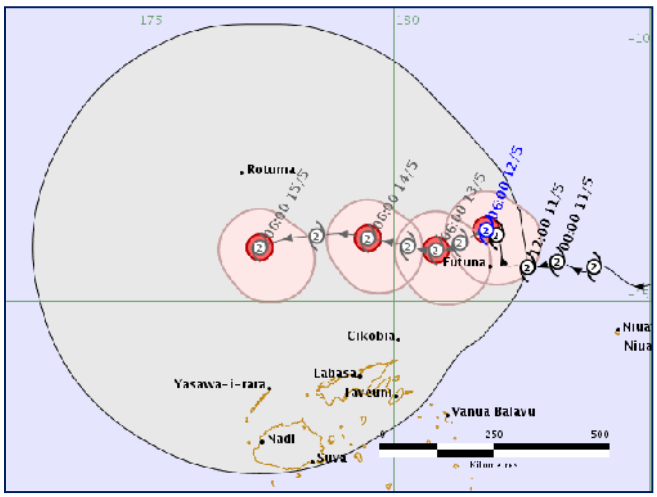
Featured image: Tropical Cyclone "Ella" at 20:30 UTC on May 9, 2017. Credit: JMA/Himawari-8

Tropical Cyclone "Ella" dumping heavy rain on Wallwas and Futuna



Off-season Tropical Cyclone "Ella" was dumping heavy rain on Wallwas and Futuna, Its maximum sustained winds were near 139 km/h (86 mph) with gusts to 167 km/h (103 mph). This made Ella a Category 1 hurricane equivalent on the Saffir-Simpson scale. Weakening was expected to

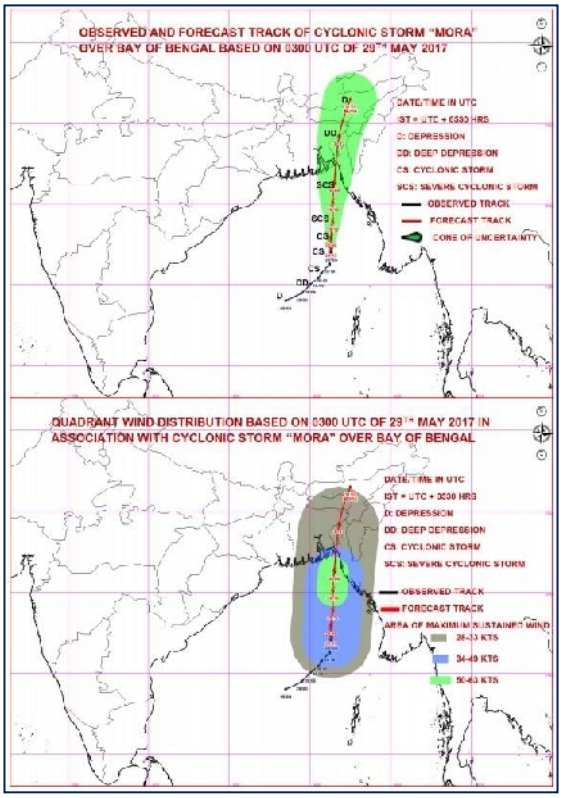
begin near 15:00 UTC on May 13.



Tropical Cyclone "Ella" forecast track by RSMC Nadi on May 12, 2017

Fiji Meteorological Service has issued a Tropical Cyclone Alert for strong winds for the islands of Vanua Levu, Taveuni and nearby smaller islands. Meteo France New Caledonia reported that a Tropical Cyclone Alert number 2 was in effect for Futuna island (Wallwas and Futuna).

EVENT: Tropical Cyclone "Mora" about to slam into Bangladesh, May 2017



Tropical Cyclone "Mora" (02B) formed in the Bay of Bengal on May 28, 2017, and was intensifying on its way toward Bangladesh. The cyclone was expected to make landfall near Chittagong after midnight UTC on May 30 with wind speeds near 120 km/h (75 mph), dangerous storm surge and very heavy rainfall. This was the second named storm of the 2017 North Indian Ocean tropical cyclone season.

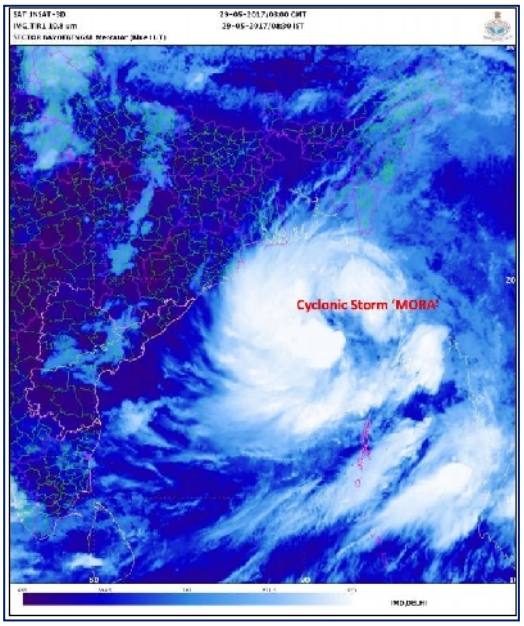
A low pressure area formed in the southeast Bay of Bengal on May 26 under the influence of a persistent area of convection and rapidly intensified. Late May 28 (UTC), IMD classified it as Cyclonic Storm "Mora." Under the influence of the precursor low of Mora, it strengthened the arrival of monsoon which caused heavy Disaster in Sri Lanka and Andaman islands with at least 180 fatalities.

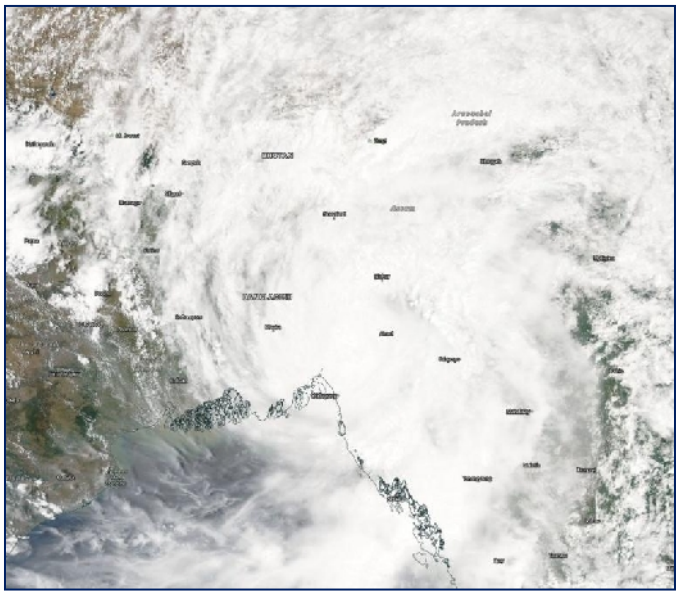
According to RSMC New Delhi Tropical Storm "Mora" Advwasory No. 5, issued 06:00 UTC on May 29, Mora was centered over the east-central Bay of Bengal and has moved at a speed of 11 km/h (6.8 mph).

A storm surge of about 1 to 1.5 meter (3.3 - 5 feet) above astronomical tide was likely to inundate low-lying areas of Bangladesh coast between Sitakund

and Uttar Jari at the time of landfall.

In wake of This tropical storm, Southwest Monsoon was likely to progress further into some parts of southeast Arabian Sea, Maldives area, some more parts of Comorin area, southwest Bay of Bengal and east central Bay of Bengal, remaining parts of southeast Bay of Bengal and some parts of west central and northeast Bay of Bengal, SkymetWeather meteorologists said.





"With westerly winds were also strengthening and likely northward shift of the shear zone, Southwest Monsoon hadmake onset over Kerala and parts of northeastern states during the next 24 - 48 hours," they added.

Featured image credit: NASA Aqua/MODWAS. Acquired May 28, 2017.

Cyclone "Mora" slams into Bangladesh: at least 6 killed, 20 000 homes damaged

Cyclone "Mora" has made landfall at 00:00 UTC (06:00 local time) on May 30, 2017, between the fishing port of Cox's Bazar and the city of Chittagong, with winds of up to 117 km/h (73 mph). Authorities raised the highest number 10 weather danger alert for people in the coastal districts of Bangladesh as the storm approached and evacuated over 500 000 people. Initial reports mention at least 6 casualties and tens of thousands damaged homes.

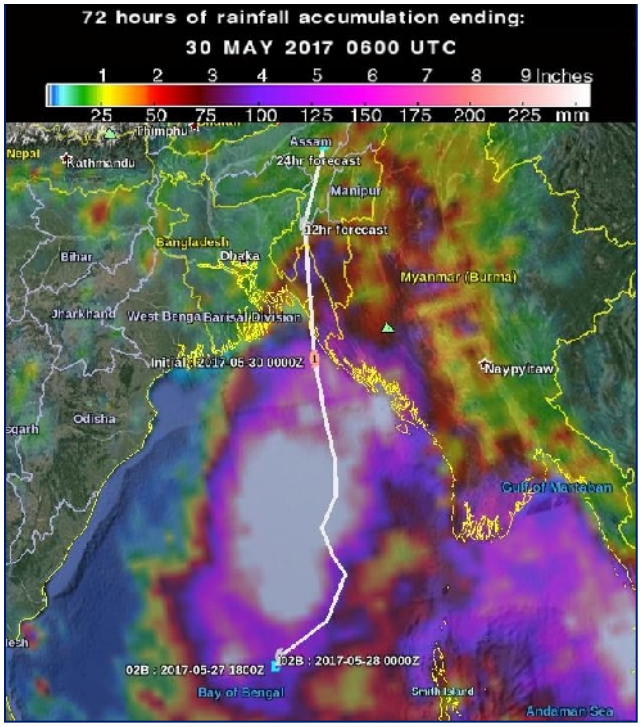
Tropical Cyclone "Mora" after making landfall over Bangladesh May 30, 2017. Credit: NASA Aqua/MODWAS

Tropical Cyclone "Mora" (02B) formed in the Bay of Bengal on May 28, 2017, as the second named storm of the 2017 North Indian Ocean tropical cyclone season. Under the influence of the precursor low of Mora, it strengthened the arrival of monsoon which caused heavy Disaster in Sri Lanka and Andaman islands with at least 180 fatalities.

Under the influence of the cyclone, low-lying areas of the coastal districts and their offshore islands were expected to be inundated by a storm surge 1.2 - 1.5 m (4 - 5 feet) high above normal astronomical tide, the Bangladesh Meteorological Department (BMD) said. All fishing boats and trawlers in the North Bay and far out in the sea have been asked to take shelter until further notice.

Mora started crossing the coast between Cox's Bazar and the city of Chittagong at 00:00 UTC on May 30 (06:00 local time) with winds of up to 117 km/h (73 mph). This placed Mora on the upper edge of Category 1 hurricane equivalent on the Saffir-Simpson hurricane wind scale.

At least 2.5 million people in Bangladesh were at risk coming in the way of the cyclone, while 11.3 million were expected to be affected. Heavy rain had continued as the cyclone tracks inland toward India, which could caused flooding and mudslides across Bangladesh, western Myanmar and northeast India.



72 hours of rainfall accumulation produced by Tropical Cyclone "Mora." Credit: NASA/JAXA GPM, UW-CIMSS/JTWC, Google

According to initial reports, at least 6 people have been killed as Mora made landfall, most of them by falling trees. One of them died of a heart attack.

The cyclone wreaked havoc in camps housing some 200 000 Rohingya refugees who were living in makeshift homes after fleeing violence in neighboring Myanmar. The damage to the camps was extensive and there had been no attempt to evacuate them, media said.

"Nobody came to alert or evacuate us. When the storm came we rushed to local schools to take shelter," Mohammad Anam, a Rohingya who fled to Bangladesh last year told AFP.

An estimated 20 000 Rohingya houses were damaged, community leader Abdus Salam told AFP. "In some places, almost every shanty home made of tin, bamboo and plastic had been flattened," Salam added. "Some people were injured, but no-one was dead."

Away from the camps, authorities had evacuated more than 500 000 people to some 500 cyclone shelters as the storm approached. "We were estimating actual losses, but we don't expect huge casualties," Ali Hossain, Cox's Bazar's chief government adminwastrator, said.

Officials in Chittagong reported winds gusting up to 135 km/h (84 mph), and said low-lying coastal areas were flooded by a storm surge with 2 m (6.5 feet) high waves.

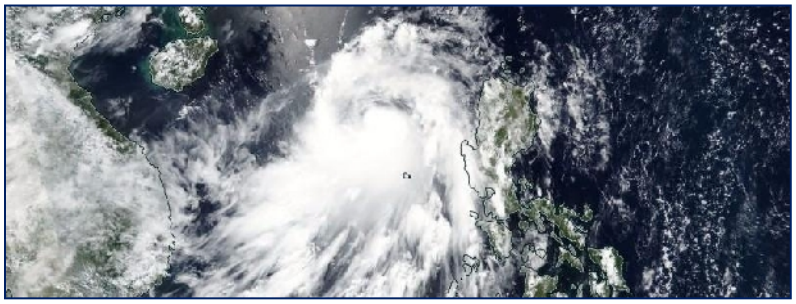
A clear picture of the damage and casualties was still not available due to poor communication with many affected areas, Bangladeshi officials told the BBC. In Myanmar, about 300 houses were damaged in Rakhine State but the extent was unclear, the government said.

Authorities in India have warned of heavy rain in the northeastern states of Tripura, Mizoram, Manipur, Nagaland and Arunachal Pradesh.

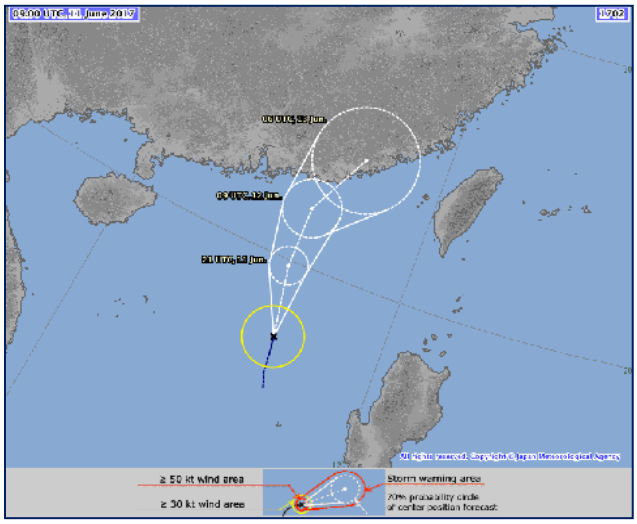
Featured image: Tropical Cyclone "Mora" after making landfall over Bangladesh May 30, 2017. Credit: NASA Aqua/MODWAS

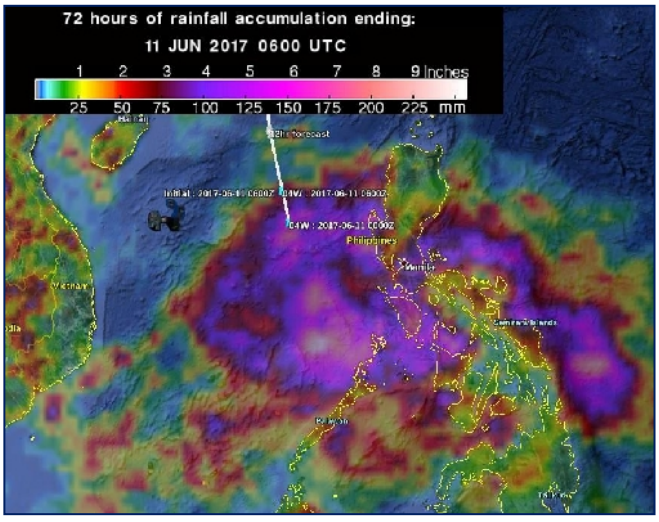
➢ **June…….**

EVENT: Tropical Storm "Merbok" forms, heading toward Hong Kong, SE China, June 2017



Tropical Storm "Merbok" (04W) has officially formed at 06:00 UTC on June 11, 2017, according to the Japan Meteorological Agency (JMA), the authority for This part of the world. Merbok was heading toward southeast China and Hong Kong. Landfall was expected in China's Guangdong province, east of Hong Kong, late June 12 (UTC).At 09:45 UTC on June 11, the center of Tropical Storm "Merbok" was located about 583 km (362 miles) NNW of Manila, Philippines and 585 km (373 miles) S of Hong Kong. Merbok was moving north at a speed of 20 km/h (12.4 mph). Maximum wind speed near the center was 67 km/h (41.4 mph), according to the JMA. Merbok's central pressure was 1 002 hPa. Slight intensification was possible.





Tropical Storm "Merbok" forecast track by JMA at 09:00 UTC on June 11, 2017. Credit: JMA

Tropical Storm "Merbok" rainfall accumulation ending 06:00 UTC on June 11, 2017. Credit: NASA/JAXA GPM

Featured image: Tropical Storm "Merbok" on June 11, 2017. Credit: NASA/NOAA Suomi NPP/VIIRS

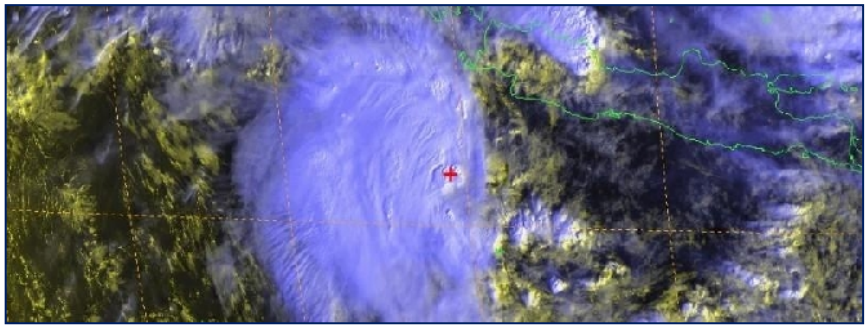
JMA expects This general motion and speed to continued over the next 24 hours, before the cyclone made landfall. A turn toward the NNE was expected within the next 48 hours.

At 06:00 UTC on June 13, JMA expects Merbok to be located on the ground, on the border between China's provinces of Guangdong and Fujian. The cyclone was expected to be heading NNE toward Taiwan and to pass just north of Taipei on its way toward Okinawa.

Merbok was affecting the Philippines, dropping heavy rain.

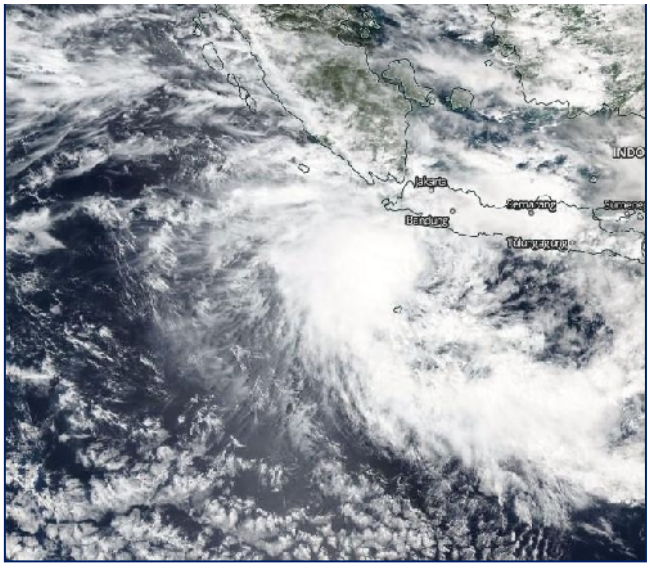
➢ **November…….**

EVENT: Tropical Cyclone "Dahlia" forms just south of Java, Indonesia, November 2017



Tropical Cyclone "Dahlia" formed south of Java, Indonesia late Wednesday, November 29, 2017, as the second named storm of the 2017/18 Australian region cyclone season. The season officially began November 1, 2017 and had end on April 30, 2018. On average, southern Hemisphere sees only 3 named storms by November 29. With TC Cempaka still active when Dahlia formed, it was the first time in history that TCWC Jakarta territory had two tropical cyclones at the same time.

Tropical Low 03U was first noted as a tropical depression by TCWC Jakarta during November 24, while it was located about 1 500 km (930 miles) to the west of Jakarta, Indonesia. By November 29, TCWC Jakarta upgraded the system to a tropical cyclone, giving it the name Dahlia.



Since Tropical Cyclone "Cempaka" was still active when Dahlia was named, it was the first time in history that TCWC Jakarta had two cyclones formed and named in its territory.

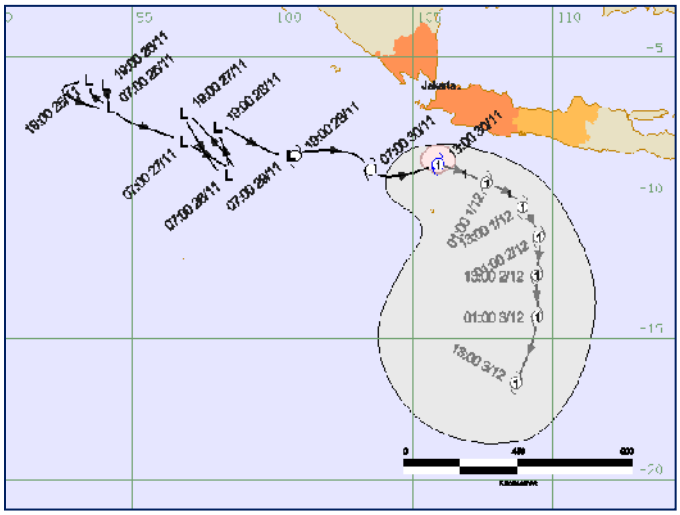
Cempaka came very close to the coast of southern Java on Monday night, November 27, producing heavy rains, landslides and tornadoes. As of November 29, it was responsible for the deaths of at least 19 people.

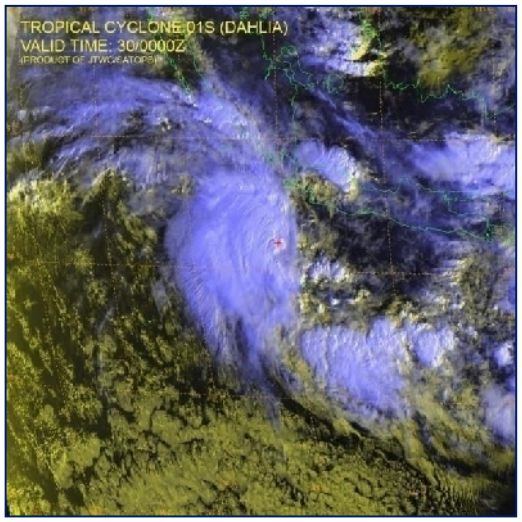
Tropical Cyclone "Dahlia" on November 30, 2017. Credit: NASA Terra/MODWAS

The system had already produced winds of up to 65 km/h (40 mph) and the speed was

expected to increase to 93 km/h (58 mph) within the next 24 hours, BMKG said, urging all ships passing the Indian Ocean to send a report every three hours to update their situation to land authorities.

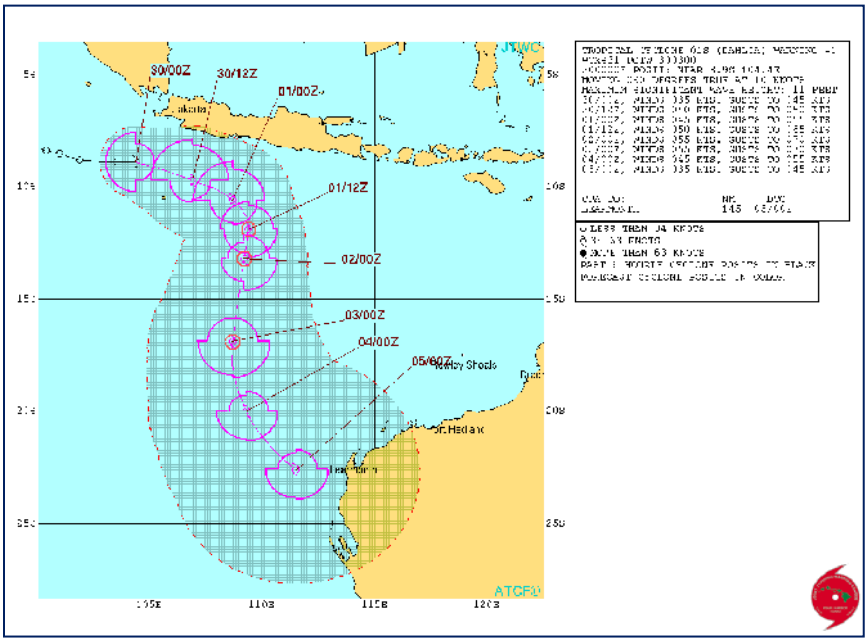
At 06:00 UTC , the center of Tropical Cyclone "Dahlia" was located 309 km (192 miles) south of Jakarta. The system was moving east at a speed of 20 km/h (12.4 mph), away from Indonesia. Moderate to heavy rain was falling on the west coast of Bengkulu to Lampung, Banten, DKI Jakarta and West Java.





Tropical Cyclone "Dahlia" TCWC Jakarta forecast track on November 30, 2017

Tropical Cyclone "Dahlia" at 00:00 UTC on November 30, 2017. Credit: JTWC/SATOPS



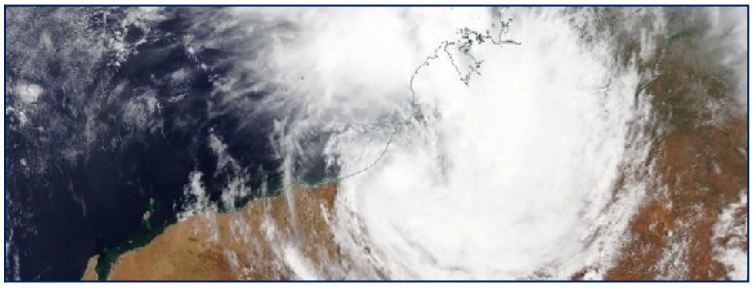
Animated enhanced infrared satellite imagery depicts a gradually intensifying system with deep convection wrapping around but slightly shewered to the west of a low-level circulation center, JTWC noted 03:00 UTC .

Tropical Cyclone "Dahlia" forecast track by JTWC at 03:00 UTC on November 30, 2017

Featured image: Tropical Cyclone "Dahlia" at 00:00 UTC on November 30, 2017. Credit: JTWC/SATOPS

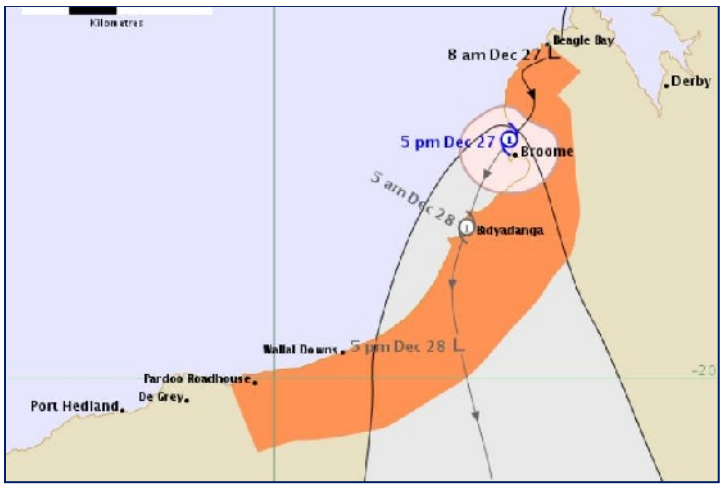
➢ **December…….**

EVENT: Tropical Cyclone "Hilda" hits Western Australia, December 2017



Tropical Cyclone "Hilda," the third named storm of the 2017/18 Australian region cyclone season, formed Wednesday, December 27, 2017, and hit Western Australia later that day with heavy rain and strong winds.

According to the Australian Bureau of Meteorology, Hilda was moving at 12 km/h (7.4 mph) almost parallel to the coast near Anna Plains and hit the Western Australia coastline overnight Friday, local time, with wind gusts reaching 120 km/h (74 mph). The cyclone has already dumped more than 150 mm (5.9 inches) of rain on the Dampier Peninsula north of Broome.



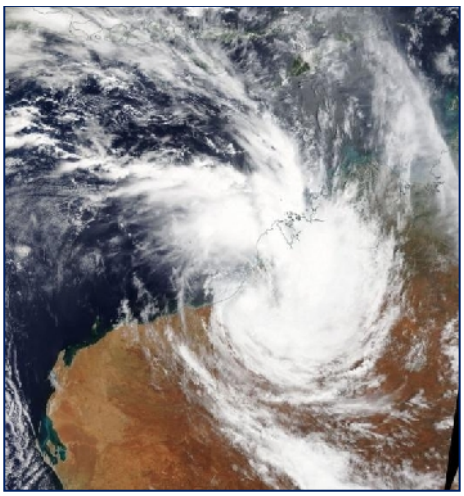
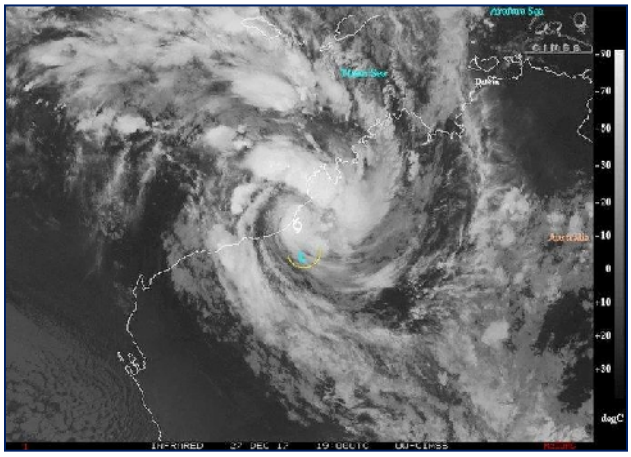


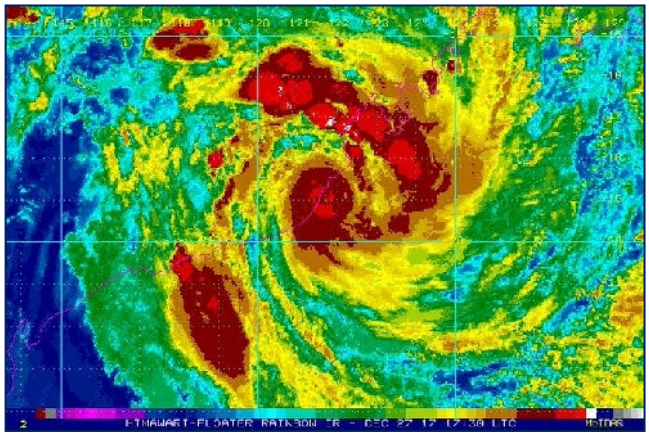
Image courtesy BOM

Tropical Cyclone "Hilda" on December 27, 2017. Image credit: NASA Terra/MODWAS

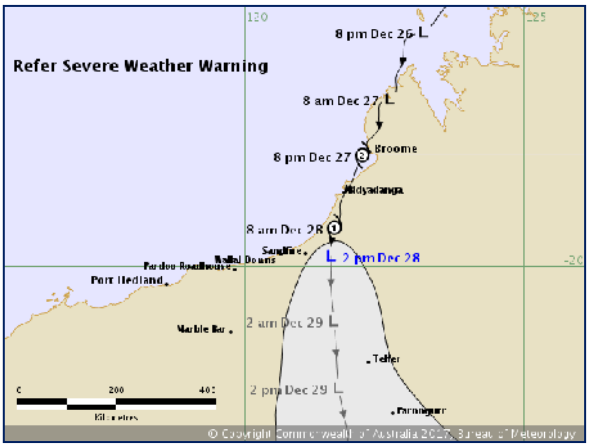
The storm brought winds up to 128 km/h (70 mph) to Broome and left up to 2 000 customers without power, as reported by the ABC. Several flights in and out of Broome were canceled and hundreds of oil and gas workers evacuated from rigs near the coast.

Hilda has since weakened into a tropical low. However, strong gusty winds and heavy rainfall were expected near the track in eastern Pilbara and tomorrow.





At 06:00 UTC (14:00 AWST), the center of Ex-Tropical Cyclone "Hilda" was located 50 km (31 miles) east of Sandfire and 225 km (140 miles) NNW of Telfer. Its sustained winds near the center were 55 km/h (34 mph) with gusts to 85 km/h (53 mph) and the cyclone was moving S at 10 km/h (6.2 mph).



"Gales were no longer expected, however, heavy rainfall and squally thunderstorms with gusts to 100 km/h (62 mph) were possible over inland eastern Pilbara areas and adjacent Interior and overnight as the system tracks to the south," BOM said.

Image courtesy BOM

Featured image: Tropical Cyclone "Hilda" on December 27, 2017. Image credit: NASA Terra/MODWAS

Blizzards

Category: Natural

A blizzard was a severe s storm characterized by strong winds causing blowing s those results in low visibilities. The difference between a blizzard and a storm was the strength of the wind, not the amount of s. Blizzards have sustained winds or frequent gusts that were greater than or equal to 56 km/h (35 mph) with blowing or drifting s which reduces visibility to 400 m or 0.25 mi or less and must last for a prolonged period of time—typically three hours or more. Blizzards can brought whiteout conditions, and can paralyze regions for days at a time, particularly where sfall was unusual or rare. Ground blizzard was a condition where loose s or ice on the ground was lifted and blown by strong winds.

Below were the extreme blizzards which occurred in the year 2017.

- **January…….**

EVENT: Europe in the grip of Arctic outbreak, hurricane-force winds hit Adriatic coast, January 2017

Cold Arctic air has reached and settled over the central Mediterranean, causing bitterly cold temperatures across much of Europe. Hurricane-force winds were affecting the Adriatic coast for the second day in a row and producing intense sea-effect sfall over the south-central Italy. As of late January 7, at least 23 people have lost their lives and the death toll was expected to rise .January 5, a storm surge has the worst flooding on Germany's north-east coast since 2006, leaving streets and cars submerged and causing major damage. Towns and cities along the Baltic coast were flooded, from Kiel in the far north to the resort island of Usedom near the Polish border, the BBC reported. Sea levels were recorded in the port of Wwasmar at 1.83 m (6 feet) above normal overnight. Severe winter conditions were also present in Sweden and Finland. The overnight temperature fell to -41.7 °C (-43 °F) at Muonio in Finnwash Lapland, near the north-western border with Sweden. It was the coldest night of the winter so far.

Further west in northern Sweden, temperatures fell as low as -41.3 °C (-42.3° F) and road conditions were treacherous in much of the country. January 6, the cold arctic air mass had spread further south across central Europe and was already far south over the Balkan peninsula and even southern France. Severe Bura winds wreaked havoc across the entire Adriatic coast. Near-hurricane and hurricane-force winds ripped out trees and caused widespread traffic chaos and localized power blackouts in Croatia. The strongest winds measured along the Adriatic coast were 218 km/h (135 mph) at Most Pag and 196 km/h (122 mph) at Jasenice. Zavižan registered 148 km/h (92 mph), Dubrovnik 143 km/h (89 mph) and Split 130 km/h (81 mph).Split saw daily mean temperature of -3.4 °C (25.9 °F), which was 11.5 °C (20.7 °F) lower than the daily average for January 6. The last time it was that cold in Split was on January 1, 1985, Crometeo reported. Due to strong winds, the real feel was about -24 °C (-11.2 °F) and meteorologists warned January 7 could brought low temperatures not seen in the region in the past 50 years.

The same powerful winds blowing across the warm Adriatic Sea were causing intense sea-effect sfall and locally blizzard conditions for the second day in a row in parts of central and southern Italy, most notably in Abruzzo region. The result was exceptionally heavy sfall. At the same time, eastern Poland, northern Ukraine, and Belarus were experiencing -25 °C (-13 °F) to -35 °C (- 31 °F) wind chills, towards -50 °C (-58 °F) in Russia. Perceived temperatures at the end of Friday, were -25 °C (-13 °F) in Poland, -42 °C (-43.6 °F) in Slovakia, - 20 °C (-4 °F) in southern Germany and -54 °C (-65.2 °F) in northern Russia.

On Saturday, January 7, Scandinavia was slightly warmer, due to southwesterlies beginning to advect slightly less cold air. Morning wind chill values were generally -5 to -15 °C (23 to 5 °F). The British Wasles and Ireland were much milder, again with southwesterly winds advecting warmer air - wind chill values were above zero degrees Celsius, Severe Weather Europe explained. Split, Croatia registered -7.2 °C (19 °F) which was the lowest recorded temperature This Mediterranean city experienced in the last 54 years. Due to strong winds, the real feel temperature was -27 °C (-16.6 °F). The lowest ever temperature measured in Split was -9 °C (15.8 °F) on January 23, 1963.At least 10 homeless people have died in Poland. Since November 1, at least 53 people have died of hypothermia or fallen to their deaths in the mountains in sub-freezing temperatures, officials said.

In Italy, the cold had been blamed for seven deaths, including five homeless people, two of them Polish nationals. Prague's emergency services reported three deaths - two homeless people and a parking lot guard - overnight in the Czech capital, the coldest night so far This winter. Temperatures in Moscow fell to -30 °C (-22 °F) overnight and to -24 °C (-11.2 °F) in Saint Petersburg where police found the body of a man who had died of hypothermia. In Bulgaria the frozen bodies of two Iraqi migrants were discovered by villagers in a mountain forest in the southeast of the country near the border with Turkey, the AFP reported. Turkey's biggest city Wastambul received 65 cm (25 inches) of s, paralyzing the city and canceling hundreds of flights.

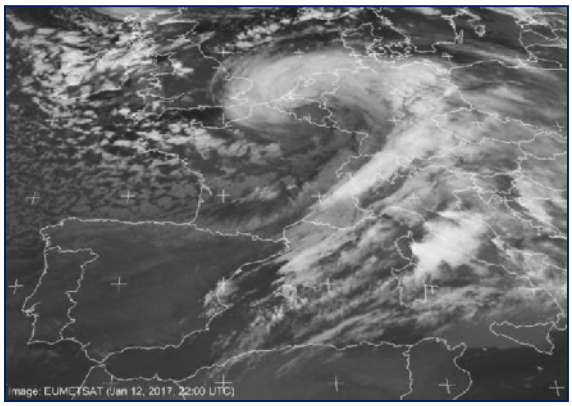
Credit: NASA/NOAA/DoD SuomiNPP/VIIRS. Acquired: January 6, 2017

Featured image: Hurricane-force Bura at Križac, Velebit Channel. Credit: Aleksandar Gospić

EVENT: Violent storm hits Europe, 330 000 homes without power in France, January 2017

A powerful cyclone hit Great Britain on Thursday, January 12, 2017 and rapidly strengthened over the English Channel and northern France, brought hurricane-force winds to the region. Its center then moved over Belgium, Luxembourg, Netherlands, Germany and Poland. The storm first hit Britain, brought heavy s to

Scotland, Northern Ireland, and parts of England. Authorities issued severe flood warnings for the country's eastern coastal areas and evacuated Suffolk, Essex, and Lincolnshire. London's Heathrow canceled 80 flights as the storm approached. The cyclone underwent rapid strengthening (bombogenesis) during the late UTC afternoon of January 12 over northern France. Normandy and Picardie regions were the hardest hit.In the northern port city of Dieppe, weather stations registered peak winds of 146 km/h (90.7 mph). The strongest reported winds in France were measured in Markstein, near the border with Germany and Switzerland, at an altitude of 1 200 m (3 940 feet). Weather stations there measured record breaking winds of 163 km/h (101.3 mph).Over 6 000 rescue workers were called out to deal with 4 452 emergencies, the France24 reported. More than 1 000 people were forced to evacuate their homes of fallen trees, ruptured power cables, and damaged roofs. An international Thalys train with 200 passengers was left stranded in northern France overnight because of a fallen tree branch on the line.



Winter storm "Egon" on January 12, 2017. Credit: EUMETSAT

A woman was killed by a falling tree in the town of Saint-Jeannet near Nice. More than 330 000 homes in France were left without power as the storm hit. Some 200 000 were still without power Friday morning.

In Germany, at least two people have died on slippery roads as hurricane-force winds and s swept across the country early Friday, January 13. One casualty was reported in Schleswig-Holstein and another in near Fulda in Hesse.

By January 13 morning, Egon had already covered parts of Germany in s, uprooted trees and shut down streets, The Local reported. The German Weather Service (DWD) said that certain areas may get up to 30 cm (11.8 inches) of s within hours. Frankfurt, Leipzig, and Dresden airports canceled flights."The storm was so strong that the airplane handling crews had to be temporarily stopped," a spokesperson for the Frankfurt airport company told AFP. In Rhineland-Palatinate, southwestern Germany, winds reached a speed of up to 148 km/h (92 mph).

In Switzerland, Egon has produced the strongest winds in the mountains west of Zurich, near the border with France and Germany. Weather stations there measured winds of 154 km/h (96 mph), according to the Meteo News.

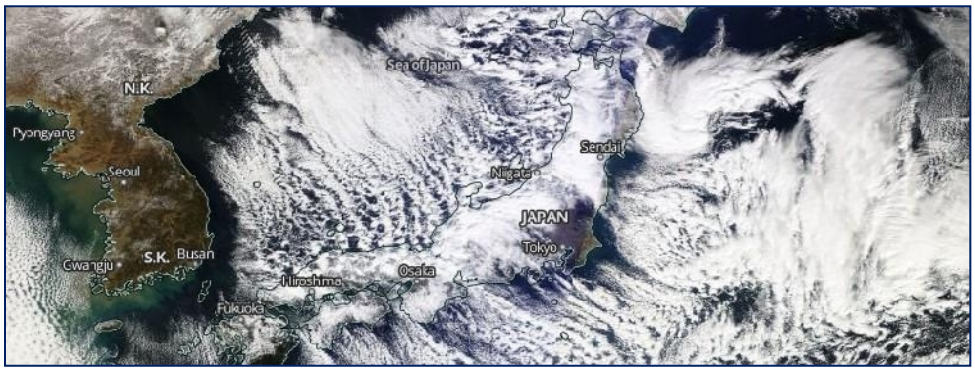
A 10-car collission has occurred in a highway tunnel near Basel, one person was injured. Some 10 000 homes were left without power near Biel after trees fell on power lines.

Egon was expected to continued its NNE track over Lithuania, Latvia, Estonia, southeastern Finland and into northwestern Russia by early January 15, 2017 (UTC).

Featured image: Traffic chaos in Germany caused by Winter storm "Egon" - January 13, 2017. Via WetterOnline

➢ **February…….**

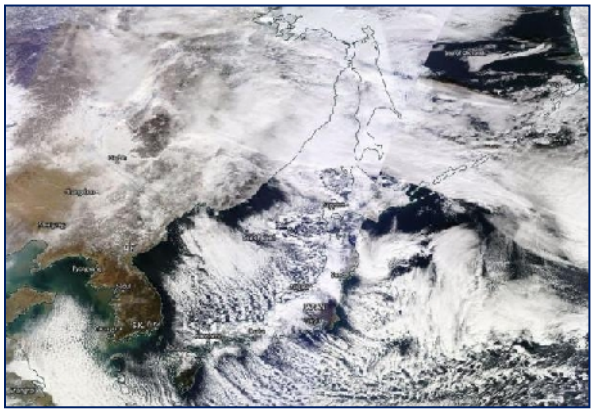
EVENT: Severe winter storm hits Japan, intense sea-effect s, February 2017



A major winter storm was affecting the Japanese archipelago Japan. The storm was producing typhoon-force winds and prolonged, intense sea-effect s. Extreme amounts of s have fallen in parts of Japan and claimed lives of at least 2 people. More than 40 were injured by Sunday morning UTC, January 15, 2017. The Japan Meteorological Agency (JMA) has issued warnings on sstorms through Monday, January 16, 2017. It said s had settle in plains along the Pacific through Sunday as strong cold air mass covers the archipelago .Over a 24-hour period through Saturday morning, January 14, up to 70 cm (2.3 feet) of s had fallen in Niigata, 52 cm (1.7 feet) in Nagano Prefecture and 46 cm (1.5 feet) in Toyama Prefecture, but it was important to understand that these values fell on top of the s base that has already accumulated through the past several days. Okura and Aomori, for example, saw more than 2 m (6.6 feet) of s while some ski resorts in Hokkaido reported nearly 3 m (9.8 feet). Up to 100 cm (3.28 feet) of s was forecast to fall in the Hokuriku region through Sunday morning, 70 cm (2.3 feet) in Kanto-Koshin and Tokai, 60 cm (1.96 feet) in Kinki and Chugoku, 50 cm (1.64 feet) in Tohoku and 40 cm (1.31 feet) in Hokkaido.

These huge amounts of s were brought by several days of intense sea-effect sfall.

Credit: JMA/Himawari-8

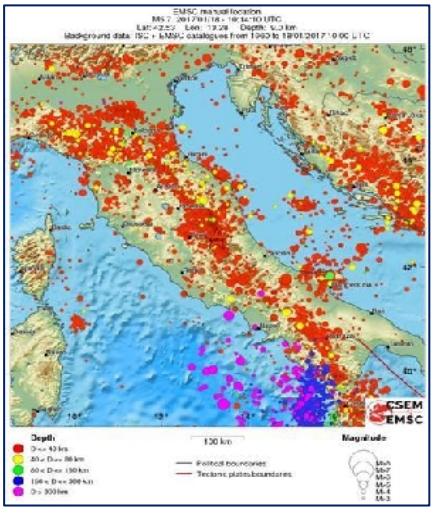


Intense sea-effect s affecting the Japanese archipelago on January 15, 2017. Credit: NASA Terra/MODWAS

Von Kármán vortices in the East China Sea on January 15, 2017. Credit: NASA Terra/MODWAS

Featured image: Intense sea-effect s affecting the Japanese archipelago on January 15, 2017. Credit: NASA Terra/MODWAS

EVENT: Series of strong earthquakes hit Italy amid extreme snowfall, February 2017



A series of strong earthquakes were hitting central Italy since 09:25 UTC on January 18, 2017. Within the first two hours, EMSC registered 21 moderate to strong earthquakes; by 15:52 the agency registered a total of 102 earthquakes. This region was under powerful blizzard conditions with parts under more than 2.5 meters (8.2 feet) of s .The strongest earthquake so far was M5.7 at a shallow depth of 9 km (5.6 miles), according to the EMSC. USGS registered the same magnitude and a depth of 10 km (6.2 miles).The epicenter was located 5.3 km (3.3 miles) NW of A matrice and 30.7 km (19.1 miles) NNW of L'Aquila, and about 96 km (60 miles) NE of capital Roma, Italy.

There were about 3 015 234 people living within 100 km (62 miles). The quakes were hitting the region devastated last year by a series of destructive earthquakes in which nearly 300 people lost their lives.

The M5.7 quake was strongly felt in capital Rome where the metro system and some schools have been evacuated.

There were no immediate reports of casualties or damage but This region was under powerful blizzard conditions and heavy s which was blocking roads and limiting initial assessment. The quakes have triggered a deadly avalanche at the base of the Gran Sasso mountain range near the Rigopiano di Farindola hotel. Up to 30 people were feared dead.

“Around 30 people were unaccounted for, between guests and workers at the Hotel Rigopiano in Farindola,” Fabrizio Curcio, head of Italy’s civil protection department, said.

Featured image credit: USGS

EVENT: Historic s blankets eastern Spain, February 2017

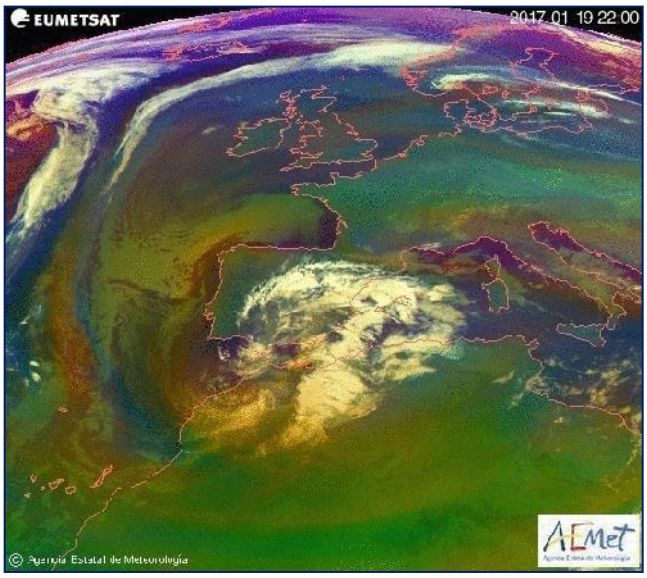
Eastern Spain was experiencing an extremely rare winter weather for This region on January 18, 2017, when parts other region saw their first s in 90 years. Through January 20, at least 3 000 people became stranded on roads due to heavy s. S was not so rare in central Spain and higher ground, but on the east coast, it happened just a few times in the past 100 years. Meteorologist Danny Høgsholt described the event as historic. "Extremely rare s was falling across the southern and eastern coast of Spain. In some cases, it was the first s in 90 years," he said.

In Torrevieja, just east of Murcia, the s was first since December 2, 1926. Before that, the city saw s on January 2, 1914. "So, it was only the second time in 100 years that the city experienced s," Høgsholt said. The average temperature there in January was 16.2 °C (61.6 °F).

On Thursday, January 19, the city of Murcia saw its largest s accumulation since 1983, although just a few centimeters. For Murcia, the average high temperature in January was 16.6 °C (61.9 °F), the average low was 4.7 °C (40.5 °F). That day, however, the temperature was just above 0 °C (32 °F). It started sing before midday and kept going for three hours.

Further south, the coastal city of Cartagena saw its first s in 80 years. It sed in Cartagena only three times in history, in 1914, 1926 and 1939, but not since.

According to the Murcia , the s started to spread along the coastal areas from Alicante fairly, and national TV was filled with images of thick s along the beaches of Costa Blanca. It crept slowly along the coast into Murcia, falling in San Petro del Pintar and San Javier, and slightly further inland, before finally reaching the city of Murcia and then Cartagena, just before lunchtime.

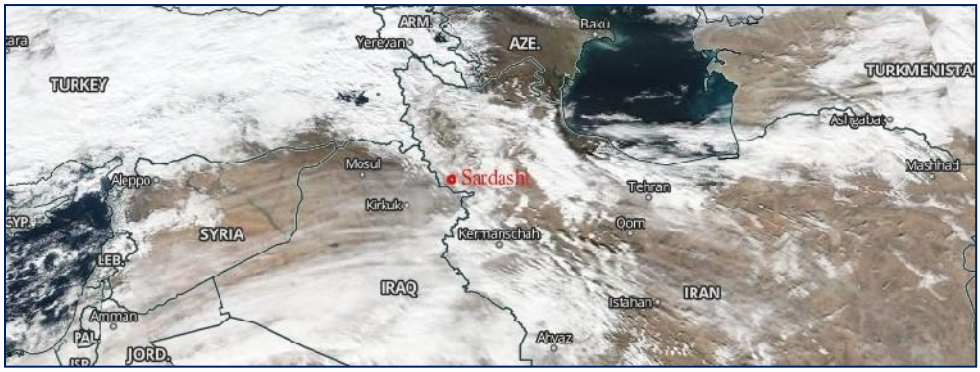


The urban beaches of Cala Cortina, parts of La Manga del Mar Menor and Cabo de Palos were slowly cloaked in white, and although the s settled for just a brief period before turning into sleet, it was enough to send most of the city outside to capture the first s in the city for 80 years.

While many took the opportunity to enjoy the rare event, substantial s and travel problems occurred through January 20 in other parts of eastern Spain. The heaviest s was registered in the Sierra Nevada and northward to the Iberian Chain. A total of 44 cm (17.3 inches) of s was measured in the village of Fuente de la Sabina.

The Associated Press reported that some 2 000 people were trapped overnight in vehicles as heavy sfall cut off several roads in eastern Spain. "The army's emergency unit said Friday it was distributing blankets and hot drinks to hundreds of people trapped on the A3 highway linking Madrid to the coastal city of Valencia and on other roads in the region. Soldiers and firefighters used splows to try to clear the s, managing to open A3 traffic toward Valencia although it remained blocked toward Madrid."

EVENT: Severe storms hit Iran, at least 9 killed in avalanches, February 2017

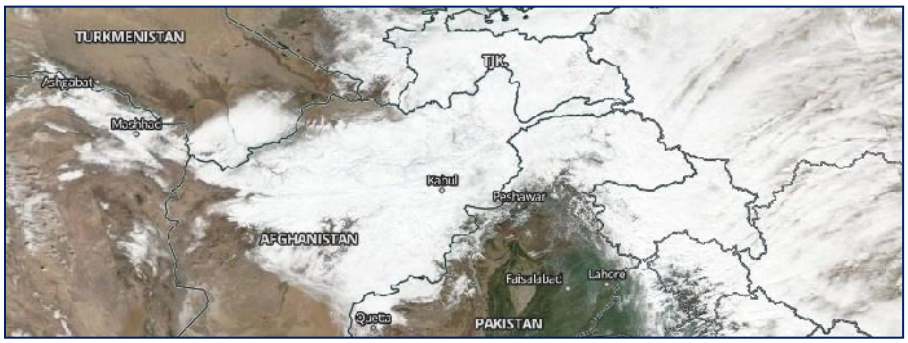


A raging blizzard affecting much of Iran has claimed lives of at least 9 people by February 1. Fatal avalanches started on Sunday, January 26, 2017.According to Tehran Times, sstorms were affecting 24 Iranian provinces since January 25. Some 29 000 individuals received rescue and relief services in 241 cities, towns and villages and 2 010 were accommodated.

Fatal avalanches claimed lives of at least 9 people by February 1.IRNA said at least 4 died when an avalanche hit porters smuggling goods across Iran-Iraq border near Sardasht on Sunday, January 26. Eyewitnesses told Al Sumaria that the avalanche hit a convoy of 35 people, of which 11 died. The area was reportedly under 2 to 3 meters (6.5 - 10 feet) of s. Two mountain climbers were killed by an avalanche in Baneh and another one in a village in West Azerbaijan Province. Tehran Times reported two more deaths due to an avalanche in Kordestan Province.

Featured image: NASA/NOAA/DoD satellite image acquired January 26, 2017. Edit: TW

EVENT: Storm claims over 140 lives in Afghanistan and Pakistan, February 2017



More than 140 people have lost their lives in mountainous regions of Afghanistan and neighboring Pakistan after unprecedented s in last 10 years covered much of the region. Most of the people died in avalanches and officials warn more were expected as sstorms continued. The death toll was expected to increase as reports come in from remote areas. Dozens of people were still missing. Afghanistan's National Disaster Management Authority (NDMA) said extraordinary sfall has particularly affected 22 of country's 34 provinces, completely destroying more than 150 homes. More than 50 others were heavily damaged as of Sunday afternoon, February 5, 2017.

The worst hit areas so far were north-eastern province of Badakhshan, Nangahar in the east and Parwan near Kabul. The government has declared a public holiday after sstorms caused havoc across much of the country claiming at least 54 lives over the past three days. More than 50 others were injured in different parts of the country and dozens were still missing. The death toll was constantly increasing.

Avalanches had also killed around 550 animals and destroyed more than 1000 hectares (2500 acres) of farmland. The Anadolu Agency said that the country was experiencing unprecedented s in a decade which led to the closure of main highways, leaving many people stranded, out of power and other supplies. The main international airport and government offices in Kabul were closed due to heavy sfall. The Salang pass north of Kabul was also closed under as much as 2.5m (8.2 feet) of s, Reuters reported.

Image credit: NASA/NOAA/DoD Suomi NPP/VIIRS. Acquired February 5, 2017

Reports received mention at least 69 killed in Afghanistan.50 in eastern Afghanistan and 19 in northern.

In neighboring Pakistan, at least 13 people have been killed in the northern district of Chitral on Saturday, February 4.

Nine people, including four children, were killed in the village of Shershal in the region - which had experienced up to 1.2 m (4 feet) of s, Sky News said.

February 6, the death toll in Afghanistan has reached 137. Heavy sfall and freezing temperatures killed 27 children in the northern Jawzjan province, all under the age of five. This brought the total number since the start of the winter to at least 164.Aid was being delivered by helicopter to the worst-hit province, Nuristan, where at least 64 people had been killed, including 53 in one village, the provincial governor, Hafiz Abdul Qayyom, told AFP.

EVENT: Historic February storm hits British Columbia, Canada, February 2017

Parts of Canada's British Columbia have experienced heavy s February 6, 2017. Some communities received their entire yearly sfall average in only 72 hours. The next storm started affecting the region. Around 43 cm (1.4 feet) of s fell in Powell River. During the same period, Chilliwack recorded 77 cm (2.5 feet), its yearly average. The community of Sparwood in the Elk Valley received some 60 cm (1.9 feet) of s in only nine hours, The Weather Network reported. Sparwood's previous record was 18.3 cm (7.2 inches).The sstorm has left more than 120 000 B.C. Hydro customers without power at the peak, shut down several school districts and closed parts of Highway 3 and 31.

Avalanche Canada had issued an extreme danger rating for the South Rockies. S continued falling into Tuesday, February 7.Meteorologists warned another system that had started affecting the region, and 'could make for a complicated situation, as it coincides with a return to more seasonal temperature.' This next storm could produce flooding in and around metro Vancouver.

Featured image: Historic February sstorm hits parts of British Columbia, Canada - February 6, 2017. Credit: The Weather Network.

EVENT: Powerful winter storm blasting Northeast US, February 2017

A powerful and fast-moving winter storm brought significant impact to parts of the northern Middle Atlantic through northern New England Thursday into Thursday night, February 9, 2017. This was the first significant s for the region since early-mid January. Sfall rates may exceed 50.8 mm (2 inches) per hour. Officials also warned of high winds, coastal flooding and possible power outages. The storm was brought heavy s, high winds and localized blizzard conditions causing dangerous travel conditions along the major Interstate 96 corridor including Philadelphia, New York City, and Boson. More than 3 000 flights were canceled, including some in the Washington. The National Weather Service had issued a special weather statement for the New York metro area due to heavy s and wind, which were coming together to produce very low visibility. “Travel was extremely dangerous,” the service said. New York City Major Bill de Blasio said people should stay home. "If you need to go out, please, don't use your car," he said.

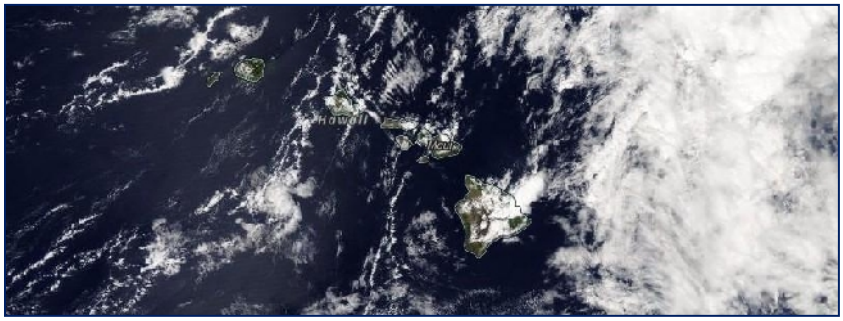
Schools were closed in Albany, New York City, Philadelphia and Boston, numerous accidents were reported. Sfall rates have been extreme at times, ranging from 25.4 mm to 101.6 mm (1 - 4 inches) per hour.LaGuardia airport (NY) recorded 76.2 mm (3 inches) of s per hour between 08:00 and 10:00 EST. The storm, named Niko, comes a day after much of the Northeast enjoyed a brief glimpse of spring, with temperatures hitting 15.5 °C (60 °F) in some places, AFP said.

The s was expected taper off in the Philadelphia and New York City areas, but New Englanders were bracing for sfall, they were expected to be the hardest hit.

Featured image credit: Live Storms Media

- **March…….**

EVENT: Severe storm hits Hawaii, dumps heavy rain and snowfall, March 2017



Hawaii had been hit with sustained blizzard conditions that have dumped over 20 cm (8 inches) of s onto its mountain peaks, March 1, 2017. Blizzard warning for Mauna Kea and its sisster peak Mauna Loa was canceled. While the mountain tops received s, the rest of the Big Island dealt with heavy rain and thunderstorms that pelted the lower elevations. Both Oahu and Kauai were under flash flood warnings. Temperatures were mild, with highs in the 70s and 80s (21 - 27 °C), USA reports. The National Weather Service said that s on Hawaii's peaks was not uncommon in the colder months because they were nearly 4.2 km (14 000 feet) high. Mauna Kea has a sub-Arctic climate, it added."The reason for the s amounts being heavier than we usually see was that the upper low (pressure system) really prewashed down there, that has allowed colder air to remain locked in place," said Andrew Orrwason of the NWS' Weather Prediction Center. S fell on both mountains on at least two occasions in December. Mauna Loa and its sister peak of Mauna Kea, the highest point in the state, were both volcanoes. The only other area of Hawaii that gets s with any regularity was the Haleakalā volcano on Maui, which at about 3 km (10000 feet) gets s once every five years or so.“As long as we have deep enough clouds to support ice crystals, and when you have cold enough temperatures at the summit level, you can get sfall,” said Matthew Foster, a staff meteorologist with the weather service in Honolulu.

The coldest temperature ever recorded in Hawaii was -11.1 °C (12 °F) on Mauna Kea on May 17, 1979.In California, meanwhile, heavy rains have swollen rivers and reservoirs and blanketed the Sierra Nevada mountains with twice as much s as usual This winter, helping power the state out of five years of severe drought, Reuters reported."With winter not yet over, the state was already among the top two to three seasons on record for s and rainfall in Northern California. Right we're looking at potentially an all-time record for rainfall and you have to go back to the winter of 1982-

83 for s pack being as deep as it was."He added that while there was still some "lingering concern" for Southern California, which has not had as much s and rain, the northern and central part of the state were no longer considered to be in a drought.

Featured image credit: NASA Aqua/MODWAS. Acquired: March 2, 2017

➢ **April…….**

EVENT: Heavy April snowfall brought Sarajevo to a standstill, April 2017

Bosnian capital Sarajevo was hit by a heavy overnight sfall as cold outbreak spread through the Balkans. Local media was reporting massive traffic jams, trees bent under the weight of the s and power outages.

According to BalkanInsight, the severe sfall has also caused damage to the power network and several areas within the wider Sarajevo area have lost power.

"The grim weather also caused water pumps to break down, so many Sarajevans have also lost running water. Authorities were in the field, fixing the damages," it said.

Blizzard conditions were reported in Hungary, Croatia, Romania and other surrounding countries. Severe weather was expected to continued throughout the region at least until April 25. After a brief break, another cold wave was expected to roll in.

Featured image: Sarajevo under heavy April sfall, April 19, 2017. Credit: Anadolu

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EVENT: Winter returns to Europe, severe blizzards, widespread frost damage, April 2017

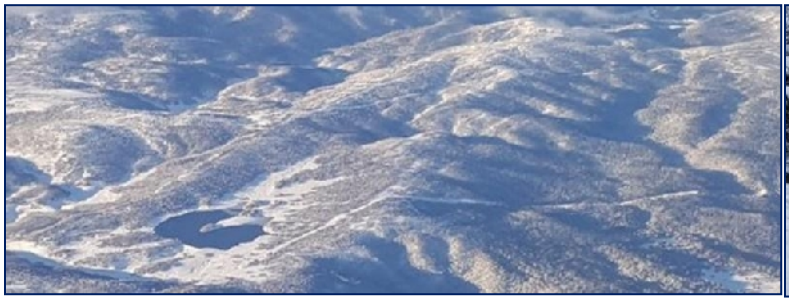
As expected, winter had returned to Europe in the middle of spring, bringing huge amounts of s, blizzard conditions and devastating widespread frost. While This first cold wave, another one was toward central Europe and Balkan Peninsula and a third which first affected Iceland and the UK and then spread

to entire Europe. After unusually warm March and the first week of April which tricked both people and plants spring had arrived, mother nature decided to take a different route and brought significant cold outbreak to much of Europe.

Severe blizzards and huge amounts of snow were reported as well as traffic chaos and devastating widespread frost, but the bad weather was still not over. While farmers were already witnessing huge damage, at least two more cold waves engulfed Europe before April ends. While such cold weather in April and the first half of May was not that unusual in parts of Europe, it was important to understand that it comes after a prolonged period of very warm temperatures and an excellent harvest forecast.

- **August…….**

EVENT: Blizzard of Oz" brought rare thunder s storms to NSW and Victoria, Australia, August 2017




A pair of so-called "thunders" storms swept through parts of New South Wales and Victoria on August 6 and 7, 2017. The storms were a part of a sstorm dubbed "Blizzard of Oz" that lasted 5 days. Thunderstorm storms have been the centerpiece of a s spectacular across the continent's south-east. A series of polar lows have brought blizzards to higher ground with the white stuff even falling in the NSW Central Tablelands, far from the ski resorts, news.com.au reports.

"Half a meter to a meter [1.6 - 3.3 feet] of s fell across the Alpine resorts, coupled with blizzards where winds gusted above 130 km/h [80.8 mph] at Thredbo. Although winds were fierce, we still got the best sfall we've seen This season," he said. In total, the sstorm lasted five days and was dubbed Blizzard of Oz on social media. "It left behind some of the best s accumulation the ski resorts have seen in years," WeatherZone's Ben Domensino writes.

A rare avalanche advice was issued by Vic Emergency following avalanches in the state's alpine region. The advice was reissued at 14:05 local time Tuesday, August 8 with reports that more avalanches had occurred on Tuesday morning.

"Avalanches were rare in Australia as the conditions which caused them weren't common in our alps," Domensino explains. "The recent spate of avalanches - which have mostly occurred in the back country away from patrolled resort areas - were likely the result of a unique sequence of weather events that occurred during the past week."

According to the UK Met Office, thunderstorms develop when warm air under colder air wants to rise. Generally, these conditions were much more common in summer and so it was not unusual to have regular thunderstorms throughout the summer months. However, they can also occurred in winter as well. If the weather was cold the rain associated with a thunderstorm can then fall as s

and thus was called thunder s. This was unusual only because it can only occurred in a few months of the year.

Interestingly, the s contained within the thunderstorm acts to dampen the sound of the thunder. While the thunder from a typical thunderstorm might be heard many miles away, the thunder during a thunder s event had only be heard if you were within 3.2 - 4.8 km (2 to 3 miles) of the lightning. When thunder s occurreds at night the lightning seems brighter - This was because the lightning reflects off the sflakes.

➢ **October…….**

EVENT: Record-breaking snowstorm hits Rockies, heaviest October s in Montana since 1914, October 2017

Havre, Montana experienced what was effectively a blizzard and recorded 37.6 cm (14.8 inches) of s, NWS Great Falls said. "However, with the power out, we'll need some time to verify the record." All of Havre was without power, Hill County sheriff said, with numerous trees and power lines down. Heavy sstorm affecting the northern Rockies and parts of the central Rockies has turned record-breaking and resulted in widespread power outages and downed trees in parts of Montana and Colorado. If the record was verified, This had been not only a daily record but a monthly, NWS said. "The current October record high s was 21.8 cm (8.6 inches) set on October 4, 1914."

"Unlike the s the Rockies experienced in September, This storm was having a greater impact since valley locations were also being affected, in addition to typical mountain areas," Weather Channel's Chrwas Dolce explained. The heaviest estimated s amount from This storm was 76.2 cm (30 inches) in Rocky Boy, Montana. Drifts in at least one location were estimated to be 2.4 m (8 feet) high.

➢ **November…….**

EVENT: First significant snowfall of the season, hurricane-force winds caused traffic chaos in Slovenia and Croatia, November 2017

First significant sfall of the season and hurricane-force Bura winds were causing traffic chaos on roads and highways in parts of Slovenia and Croatia, November 13, 2017. Wind gusts up to 150 km/h (93 mph) were measured and up to 210 km/h (130 mph)

were Drivers were caught unprepared for wintry conditions on the roads of Slovenia and Croatia as the first significant sfall of the season descended on the region.

Several trucks slipped off the road, forcing Slovenian authorities to close the coastal highway between the Razdrto and Senožeče in both directions. Several houses were flooded in the country's coastal region while the traffic was blocked by the strong Bora winds.

The situation was not much different in mountainous Croatia where highways were closed for heavy trucks in both directions. While This happens every winter, effectively cutting off coastal Croatia from the country's central regions, heavy s arrived a bit earlier This year and caught drivers by surprise.

In Pula, western Croatia, hurricane-force winds literally flung a large building platform at Uljanik shipyard which then crashed into a docked ship and the adjacent mole, causing the ship to sink and seriously damaging the platform."The force of nature was just too strong," shipyard's authorities said.

There were no reports of injuries but the Croatian Ministry of Maritime Affairs, Transport and Infrastructure said the platform has about 14 tons of fuel in it and there was a risk of sea pollution.

"There was no apparent leak, but a floating oil stain had been observed around the vessel," authorities said.

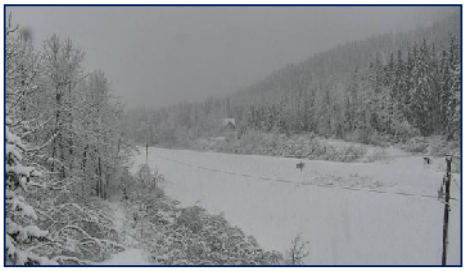
Damage at Uljanik shipyard, Croatia - November 13, 2017. Credit: Croatian Ministry of Maritime Affairs, Transport and Infrastructure

While hurricane-force winds were already affecting the region early Monday, 'a dangerous wind event was developing along the eastern Adriatic and eastern Ligurian coast and tomorrow, as tightening pressure and temperature gradients result in very strong down slope Bora winds,' Severe Weather Europe meteorologists warned.

➢ **December…….**

EVENT: Alaska records one of the most extreme snowfall rates on record, December 2017

An astonishing 25.4 cm (10 inches) of s per hour was reported at Thompson Pass near Valdez, Alaska on Wednesday, December 6, 2017. This was extraordinary even by Valdez standards, the siest town in the United States. What hit Alaska's North Gulf Coast This week,



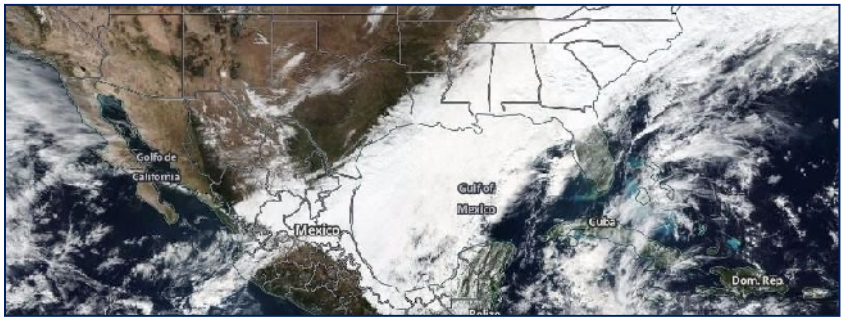
producing one of the most extreme sfall rates on record was what meteorologists like to call a "s AR" or an atmospheric river that was producing s instead of rain.

On Wednesday, December 6, This storm dropped 12.7 cm (5 inches) of s at Thompson Pass in 30 minutes, 25.4 cm (10 inches) in 60 minutes and 38.1 cm (15 inches) in 90 minutes. Within 72 hours (between December 3 - 6, 13:00 local time), the National Resources Conservation Service (NRCS) SNOTEL site at Nicks Valley at 1 300 m (4 280 feet) picked up 210.8 cm (83 inches) of s, making a total of 320 cm (126 inches).According to a quick analysis by Weather Underground's weather historian Christopher Burt, Thompson Pass storm ranks among the most intense sfalls we k of. Burton told John Hopewell of Capital Weather Gang, that on December 2, 1966, 30.48 cm (12 inches) fell in 60 minutes in Copenhagen, N.Y., and on January 26, 1972, Oswego, N.Y., recorded 44.45 cm (17.5 inches) in a two hour period. Both of these records were the result of a lake effect s. This was a 'fancy term to describe abnormally warm conditions in the West and cold conditions in the East.' "Under such a pattern, the jet stream, the super highway for storms that divides cold and warm air, surges north in the western half of the nation, and crashes south in the eastern half," Same said. This excessive s caused a 6-m-deep (20 feet) and 600-m-long (200 feet) avalanche on a part of Richardson Highway near Valdez, closing the road between milepost 12 and 42.2

Richardson Highway avalanche December 5, 2017. Credit: Alaska DOTPF

Meadow Bailey, a spokesperson for the Alaska Department of Transportation, said that their crews haven't even been able to enter the zones within the road closure due to safety issued posed by the avalanche.

EVENT: 3 dead, 480 000 without power, numerous records broken as winter storm hits US South



Nearly 500 000 people were left without power and three have died as a surprisingly strong early winter storm hit the US South on its way toward the Northeast. The storm dumped rare s on the Deep South, in many places record-breaking for December. The storm blanketed parts of the Deep South This week with up to 46 cm (18 inches) of s in places, causing traffic chaos and leaving more than 480 000 people without power as of Saturday morning, December 9, 2017. More than 334 000 homes and businesses were still without power Saturday afternoon in Georgia (235 000), Alabama, Mississippi and Louisiana. Over 170 000 woke up Sunday still without power; 125 000 in Georgia, 17 000 in Alabama, another 17 000 in Louisiana and 12 000 in North Carolina.

S started falling in Houston, Texas on December 8, making it the second earliest sfall on record. The city saw widespread s amounts between 2.5 and 7.6 cm (1 and 3 inches) and recorded its first measurable sfall in 8 years.

On the same day, Brownsville, TX had its third accumulating sfall since records began in 1895. By Saturday morning, the city received 35 cm (14.5 inches) of s. Corpus Chisti, TX had its first sfall in 13 years (since 2004) and recorded between 12.7 and 17.8 cm (5 and 7 inches) within 24 hours as well as extremely rare thunder s.

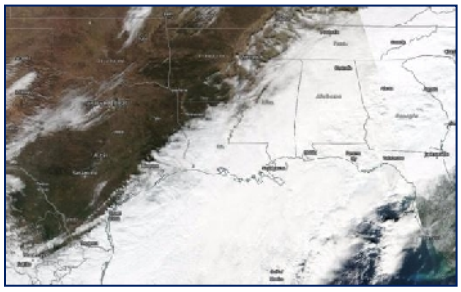
Hendersonville, North Carolina received up to 30 cm (12 inches) in places, and Asheville, NC up to 20 cm (8 inches) by Saturday morning. Up to 25 cm (10 inches) was recorded in northwest Georgia, with 18 cm (7 inches) in parts of metro Atlanta. 25 cm (10 inches) was recorded in Anniston, Alabama and up to 18 cm (7 inches) in Mississippi.

Sid King, a meteorologist for the National Weather Service in the Atlanta area described s totals as very, very abnormal and rare. "It's really not even winter yet. I would not be surprised if we broke a lot of records," he said.

The December 8th s across Central Alabama was the biggest one for so early in the season, meteorologist James Span said. Birmingham, with an official total of 10.1 cm (4 inches), it was the third siest December day on record. Only surpassed by 20.3 cm (8 inches) during the famous New Year's Eve event on December 31, 1963, and 14 cm (5.5 inches) on December 22, 1929.

Nearly 1200 flights were canceled at the Hartsfield-Jackson Atlanta International Airport and more than 400 the next day.

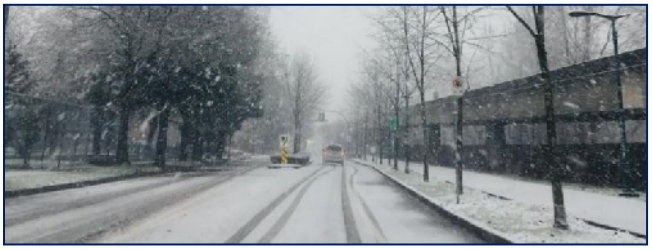
Sadly, the storm was responsible for the deaths of at least 3 people. One man died in Georgia after being electrocuted by a downed power line. Bystanders tried to warn the man before he walked into the dangling live wire, Atlanta police Sgt. John Chafee said Saturday. The two other victims were a 27-year-old woman and a 5-year-old boy who died in a car crash in Virginia. The driver apparently lost control of the car and hit a guardrail, which caused the vehicle to spin into the path of a truck.



Winter Storm Benji on December 8, 2017. Credit: NASA/NOAA Suomi NPP/VIIRS

US South on December 9, 2017. Notice s line stretching from SE Louisiana, Mississippi, Alabama, Georgia, Tennessee and into Virginia. Credit: NASA/NOAA Suomi NPP/VIIRS

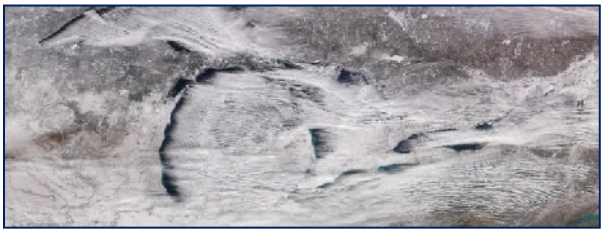
EVENT: Winter storm hits British Columbia and Alberta, leaving 2 dead, 75 000 without power, December 2017



Heavy s and freezing rain caused extensive damage to power lines across British Columbia and Alberta, Canada on December 19, 2017, leaving 75 000 customers without power. At least two people were killed in southern Alberta According to BC Hydro, the hardest hit areas were Vancouver Island communities of Victoria, Nanaimo and Duncan after heavy, wet s and freezing rain caused extensive damage to power lines, poles and transformers.

S was falling at a rate of 10 to 12 cm (3.9 to 4.7 inches) per hour in some areas of the province, resulting in poor road conditions, the Transportation Ministry said, as quoted by CTVNews.

EVENT: Numerous sfall records shattered in Erie, Pennsylvania, December 2017



A potent winter storm hit parts of the US Mid-West, Mid-Atlantic, and Northeast, dumping heavy s and creating whiteout conditions in numerous locations. In its wake, the storm left behind a perfect setup for intense and prolonged lake-effect s. While many were still witnessing huge amounts, the worst-affected area was in and around Erie, Pennsylvania where numerous sfall records were already broken and city officials declared a S Emergency. An all-time daily sfall record for the city of Erie was shattered on Monday, December 25, 2017, after a potent storm dumped 86.3 cm (34 inches) of s at Erie Airport. This was more than four times its previous record for December 25 of 20.5 cm (8.1 inches). The amount also smashed the city's siest single day record of 50.8 cm (20 inches) recorded on December 11, 1956.

Another 62.2 cm (24.5 inches) fell the total since December 23 to 159.7 cm (62.9 inches) and breaking the entire state of Pennsylvania 2-day total of 111.7 cm (44 inches), recorded in Morgantown on December 20 and 21, 1958.

It also beat the 13-day record sfall for Erie of 134.1 cm (52.8 inches) recorded from December 31, 1998 to January 12, 1999. Since the start of the month, the city of Erie saw 246.4 cm (97 inches) of s, breaking its previous monthly record of 169.9 cm (66.9 inches) measured in December 1989.

On average, Erie receives 257 cm (101 inches) of s per year and 70.6 cm (27.8 inches) from December 1 - 31.The 159.7 cm (62.9 inches) of s for the storm was the 4-day total (December 23 - 26) while the lake-effect storm total from December 24 to 26 was 153.6 cm (60.5 inches).

"Roads were dangerous and impassable," the Erie Police Department said. "This was an incredible amount of s that we're trying to move and appreciate resident cooperation. Residents should stay off of City of Erie streets until it stops sing, and we can get the roads open."

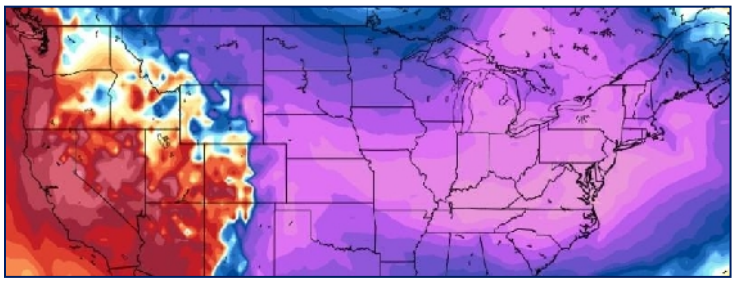
The city was prepared for an onslaught of s that hit the city beginning Sunday night, but not the magnitude of s, Mayor Joe Sinnott said Tuesday morning.

The Pennsylvania Department of Transportation has restricted commercial vehicle and motorcycle traffic on parts of Interstate 86 and Interstate 90 because of the sstorm shortly before 09:00 EST Tuesday on I-86 and I-90 from the New York line to the Interstate 79 interchange. Included in the restriction were lightly-loaded or empty tractor-trailers, recreational vehicles, non-commercial vehicles towing trailers and motorcycles, according to a release issued by PennDOT.

Speed limits have been reduced to 72 km/h (45 mph) on the interstates in Erie County and the agency was urging motorists to avoid unnecessary travel.

The Millcreek Township has joined Erie in declaring a s emergency. "Because of the s emergency, drivers were not permitted on township roads without s tires or chains. Any person found driving without them may be subject to fines," they said in a press release and also suspended the eight-hour notice for vehicles parked on roads. "There was no on-street parking allowed during the s emergency, and vehicles had been towed without notice."

EVENT: US and Canada: Extremely cold temperatures continued, list of broken records, December 2017



Extremely cold, dangerous temperatures continued across much of the United States and southern Canada with heavy wintry precipitation continuing across the Pacific Northwest and Northern Rockies into Saturday, December 30. This cold blast was both severe and unusually long, one of the sharpest New Year cold blasts on record. Numerous records were already broken and many new ones were expected before these ends. Dangerously cold temperatures and wind chills continued across the Northern/Central Plains, Great Lakes, and Northeast NWS warns. Heavy mountain s and freezing rain in some lower elevations had lead to dangerous travel conditions into Saturday, December 30 across the Pacific Northwest and northern Rockies.

Winter storm warnings and winter weather advisories were in effect with additional sfall accumulations of 30 - 60 cm (1 to 2 feet) possible in the highest terrain. The heavy rainfall across coastal regions of the Pacific Northwest should come to an end This evening as the associated cold front moves onshore.

List of notable records broken since December 25

Monday, January 1, 2018

-36.6 °C (-34 °F) was recorded in Sioux City, Iowa late December 31 into January 1, setting and new daily record low (for December 31 and January 1) and marking the city's coldest temperature since December 23, 1989.

According to Weather.com, the New Year's Day morning daily record lows include: -35 °C (-31 F) in Watertown, New York; -28.3 °C (-19 °F) in Des Moines, Iowa; -28.3 °C (-19 °F) in Moline, Illias, -26.1 °C (-15 °F) in Syracuse, New York; -20 °C (-4 °F) Buffalo, New York; and -18.8 °C (-2 °F) Harrwasburg, Pennsylvania (minus 2 degrees).

Numerous cities saw record-cold high temperatures on January 1. New York City recorded a high of -7.2 °C (19 °F), breaking the old record of -4.4 °C (24 °F) set in 1940. Chicago reached -17.2 °C (1 °F), breaking the old record of -15 °C (5 °F) set in 1969. Charleston, South Carolina registered -1.1 °C (34 °F), breaking the old record of -7.2 °C (45 °F) set in 2001. Portland, Maine recorded -12.2 °C (10 °F), breaking the old record of -10.5 °C (13 °F) set in 1967.

Sunday, December 31, 2017

Wausau, Wisconsin, set a new daily record-cold high temperature -20 °C (-4 °F) at minus 4 degrees, breaking the previous record of -3 °C (-19 °F) set in 1968.

Record lows were set in Huron, South Dakota (-32.7 °C (-27 °F)), Bangor, Maine (-31.1 °C (-24 °F)), and Flint, Michigan (-23.8 °C (-11 °F)). Record low was tied in Binghamton, New York at -19.4 °C (-3 °F).

Saturday, December 30, 2017

Glen Falls, New York registered -29.4 °C (-21 °F), for the third day in a row setting a new daily record low temperatures.

With -26.1 °C (-15 °F), Fargo, North Dakota registered the coldest high temperature since January 2004.

Thursday, December 28, 2017

Boston, Massachusetts recorded -11.2 °C (12 °F), breaking the previous record of -7.7 °C (18 °F) set in 1924 (the average for This day was 3.3 °C / 38 °F). Worcester, MA measured -13.8 °C (7 °F), breaking the previous record of -9.4 °C (15 °F) set in 1976 (the average for This day was 0.5 °C (33 °F).

Hartford, Connecticut recorded -11.6 °C (11 °F), breaking the previous record of -7.7 °C (18 °F) set in 1924 (the average for This day was 2.2 °C / 36 °F).

Providence, Rhode Island registered -10 °C (14 °F), breaking the previous record of -6.1 °C (21 °F) set in 1976 (the average for This day was 3.8 °C / 39 °F).

Flint, Michigan set an all-time December record-low temperature of -27.7 °C (-18 °F), breaking the all-time December low of -25.5 °C (-14 °F) recorded on December 27, 2017.

Alpena, Michigan, recorded -28.3 °C (-19 °F), making it the second-coldest December temperature on record there.

In Canada,

Toronto, Ontario, registered -22 °C (-8 °F) without wind chill factored in, breaking the previous daily low of -18.9 °C (-2 °F) set in 1960.

Muskoka Airport, Ontario, set a record low temperature of -36.4 °C (-34 °F), breaking the old record of -28.3 °C (-18.9 °F) set in 1963.

Montreal, Quebec, set a daily record low at -20.5 °C (-5 °F), breaking the old record of -19.5 °C (-3.1 °F) set in 1993.

Wednesday, December 27, 2017

On Wednesday, December 27, International Falls in Minnesota measured -36 °F (37.8 °C), breaking its previous daily record low of -32 °F (-35.5 °C).

Lincoln, Nebraska set its new daily record low at -17 °F (-27.2 °C) and Norfolk, also in Nebraska, at -15 °F (-26.1 °C).

Flint, Michigan set its all-time December low at -25.5 °C (-14 °F).

Tuesday, December 26, 2017

With a preliminary 157.9 cm (62.2 inches) of s, Redfield, NY broke the Oswego County record for two-day s total as of 17:47 EST on December 26 (22:47 UTC). The old record was 144.8 cm (57 inches) measured in Bennetts Bridge in February 2008.

On the same day, Detroit tied its daily record low of -4 °F (-20 °C) and Alpena, Michigan its daily record low of -16 °F (-26.6 °C).

Another 62.2 cm (24.5 inches) fell by Tuesday night on Erie, PA, the total since December 23 to 159.7 cm (62.9 inches) and breaking the entire state of Pennsylvania 2-day total of 111.7 cm (44 inches), recorded on December 20 and 21, 1958. It also beat the 13-day record sfall for Erie of 134.1 cm (52.8 inches) recorded from December 31, 1998 to January 12, 1999. Since the start of the month, the city saw more than 253 cm (99.6 inches) of s, breaking its previous monthly record of 169.9 cm (66.9 inches) measured in December 1989. On average, Erie receives 257 cm (101 inches) of s per year and 70.6 cm (27.8 inches) from December 1 - 31.

Monday, December 25, 2017

Erie, Pennsylvania hit the news This week after its all-time daily sfall record got shattered on Monday, December 25, 2017. That day, a potent storm dumped 86.3 cm (34 inches) of s at Erie Airport which was more than four times its previous record for December 25 - 20.5 cm (8.1 inches).

The amount also smashed the city's siest single day record of 50.8 cm (20 inches) recorded on December 11, 1956.

EXTREME POLLUTION EVENTS

GLOBAL

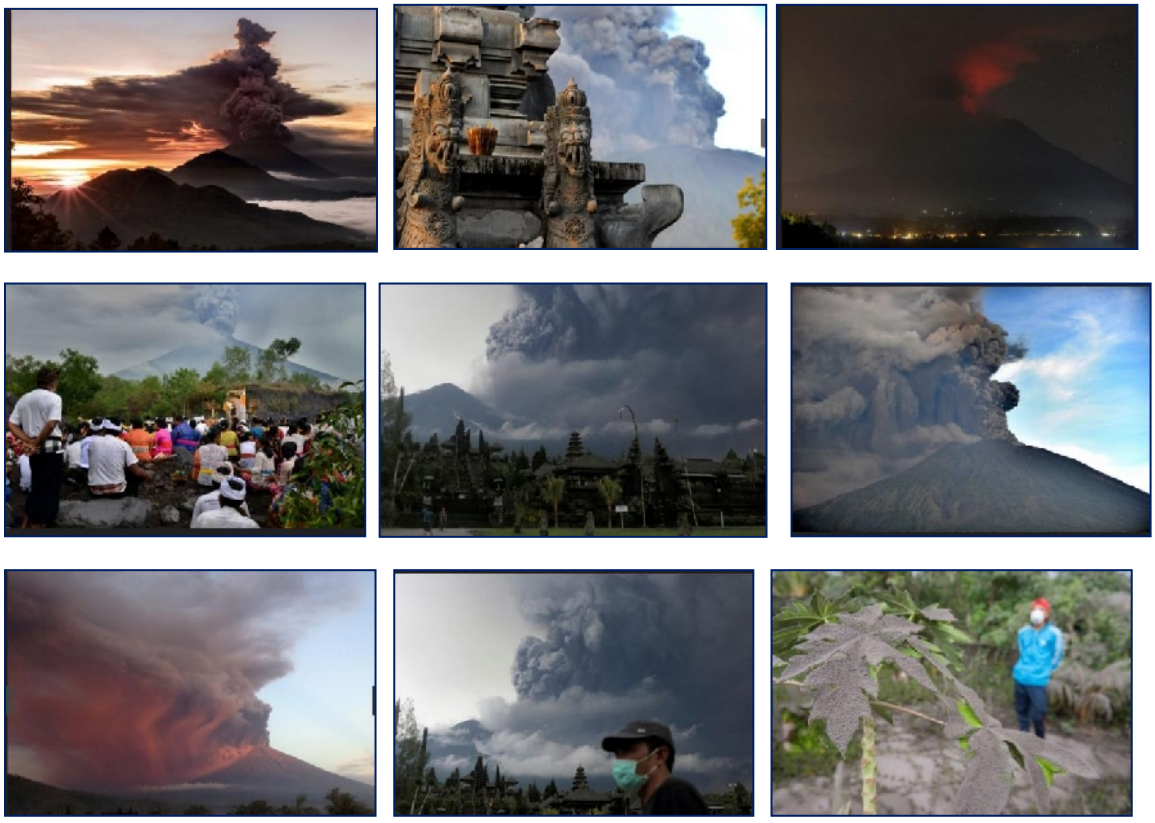
2017

Volcanic Eruptions

Category: Natural

Every year volcanoes erupt, spewing steam, ash, toxic gases, and lava. At present the world is having almost 1,500 of active volcanoes apart from continuous belt of volcanoes in the ocean floor. The major volcanoes lie in the Pacific region most commonly known as "Ring of Fire". Though eruption of volcanoes is a natural process but it gives out heat, ash particles, dust and harmful gaseous air pollutants like carbon dioxide, sulphur dioxide, hydrogen sulfide and hydrogen halides which are toxic to life. When a volcano erupts it ejects all these pollutants into the atmosphere and makes is unsuitable for any life to sustain.

EVENT: Bali's Mount Agung has first major volcano eruption since 1963, November 2017



1. ***Bali's Mount Agung has first major volcano eruption since 1963 Mount Agung volcano is seen spewing smoke and ash in Bali, Indonesia, Nov. 26, 2017. (Photo: EMILIO KUZMA-FLOYD/Reuters)***

2. Bali's Mount Agung has first major volcano eruption since 1963 Black clouds overshadows Mount Agung are seen in Abuan village of Karangasem regency, 7 kilometers from the erupted Mount Agung in Bali, Indonesia on Nov. 26, 2017. (Photo: Mahendra Moonstar/Anadolu Agency/Getty Images)

3. Bali's Mount Agung has first major volcano eruption since 1963 Mount Agung's eruption is seen next to a Balinese temple at Kubu sub-district in Karangasem Regency on Indonesia's resort island of Bali on Nov. 26, 2017. (Photo: Sonny Tumbelaka/AFP/Getty Images)

4. Bali's Mount Agung has first major volcano eruption since 1963 Mount Agung volcano erupts as seen from Glumpang village, Karangasem, Bali, Indonesia on Nov. 26, 2017. (Photo: Johannes P. Christo/Reuters)

5. Bali's Mount Agung has first major volcano eruption since 1963 Balinese Hindus take part in a ceremony, where they pray near Mount Agung in hope of preventing a volcanic eruption, in Muntig village of the Kubu sub-district in Karangasem Regency on Indonesia's resort island of Bali on Nov. 26, 2017. (Photo: Sonny Tumbelaka/AFP/Getty Images)

6. Bali's Mount Agung has first major volcano eruption since 1963 Foreign tourists take pictures as Mount Agung erupts at Besakih Temple in Karangasem, Bali, Indonesia on Nov. 26, 2017. (Photo: Johannes P. Christo/Reuters)

7. Bali's Mount Agung has first major volcano eruption since 1963 Indonesia's Mount Agung volcano erupts as seen from Amed, Karangasem, Bali, Indonesia Nov. 26, 2017. (Photo: Jose Colreavy/Reuters)

8. Mount Agung volcano erupts as seen from Besakih Temple in Karangasem, Bali, Indonesia on Nov. 26, 2017. (Photo: Johannes P. Christo/Reuters)

9. Bali's Mount Agung has first major volcano eruption since 1963 Plants in a garden are covered in ash from the eruption of Mount Agung volcano in Jungutan Village, Karangasem, Bali, Indonesia Nov. 26, 2017. (Photo: Antara Foto/Nyoman Budhiana/ via Reuters)

Indonesian and regional authorities heightened flight warnings around Bali's Mount Agung on Sunday as the volcano's eruptions sent a plume of volcanic ash and steam more than 6,000 meters into the skies above the popular holiday island. The eruptions marked the first major activity from Mount Agung since 1963. Ash covered roads, cars and buildings near the volcano in the northeast of the island, while scores of flights were cancelled and overnight a red glow of what appeared to be magma could be seen in photographs by Antara, the state news agency. (Reuters)

Dust storms

Category: Natural

EVENT: Snow, sandstorms and freezing temperatures hit UAE, February 2017

The United Arab Emirates was under the influence of a deep low pressure associated with cold air mass which was causing unstable conditions throughout the country. Snow was falling in the country's north while the rest of the country was experiencing strong winds, sandstorms and scatteredrain. Afer heavy showers on Thursday, February 2, 2017, snow has fallen on Ras Al Khaimah's popular Jebel Jais mountain on Friday and more is forecast into Saturday. UAE's National Center of Meteorology & Seismology (NCMS) Jebel Jais Mountain weather station has recorded -2.2 °C (28 °F) at 05:00 UTC (09:00 GST) today. By 18:10 GST, the temperature there dipped to -5 °C (23 °F).

Up to 10 cm (3.9 inches) of snow was reported.

Local authorities are no longer allowing motorists and residents up Jebel Jais which is causing traffic jams, the Khaleej Times reported.

At the same time, wind gusts to 85 km/h (52.8 mph), sandstorms and scattered rain were reported in other parts of the country. Strong winds and blowing sand were wreaking havoc across the country, toppling over a crane, trees and forcing the cancellation of a number of major events,

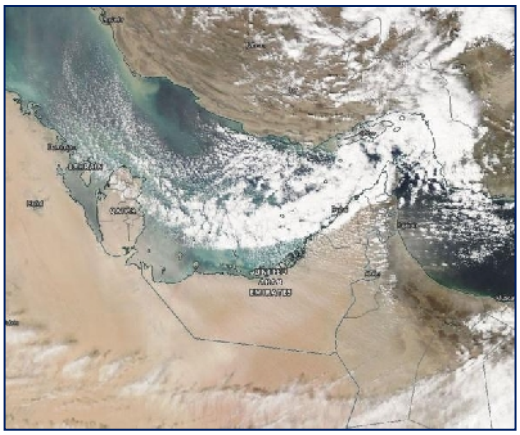
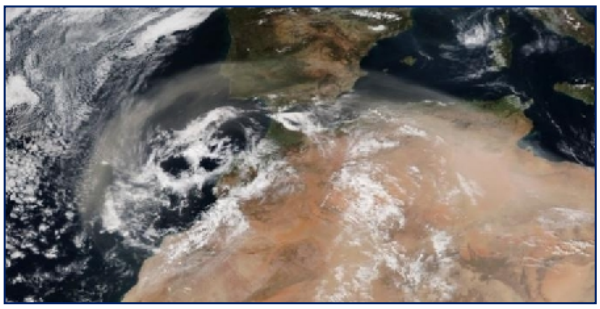


Image credit: NASA/NOAA/DoD Suomi NPP/VIIRS. Acquired: February 3, 2017

The crane crash occurred on Sheikh Zayed Road near the Crowne Plaza Dubai, injuring one person. Three cars erupted in flames as the crane fell, the Dubai Media Office said. The Dubai Tour announced it would cancel the fourth stage of the international cycling race due to weather conditions. Dubai Police had also announced the closure of Global Village due to strong winds. NCMS issued a warning to motorists across the country, particularly in the Dubai Al Maktoum International Airport area, to watch out for blowing sand and reduced visibility (less than 100 m / 328 feet) caused by strong northwesterly winds.

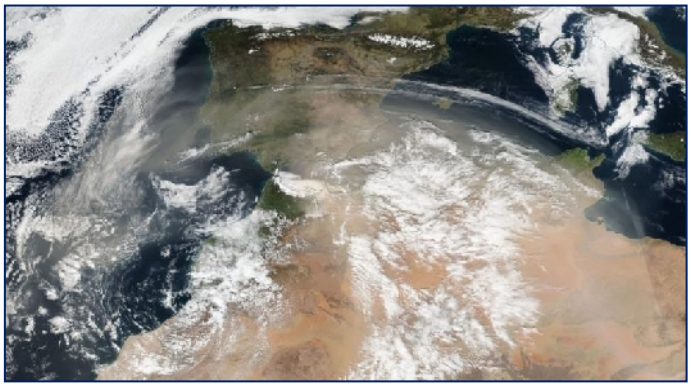
EVENT: Thick cloud of Saharan dust moving over SE Europe, February 2017



A large amount of Saharan dust was swept up into a low pressure system over north Africa on February 21, 2017. Thick dust cloud had already reached Spain and Portugal and moved east, toward Italy, Malta and the Balkans. Areas particularly affected are the Iberian Peninsula, Balearic Islands, southern France, Corsica, Sardinia, Italy, Malta, southwestern Balkans, Greece, Cyprus and Turkey.

Some dust may be deposited from the air without rainfall, but a significantly larger amount will be deposited with rainfall over the central Mediterranean and the Balkans on Friday and Saturday, February 23 and 24. Look for yellowish Saharan dust on surfaces of objects, such as cars, SWE said. The Visible Infrared Imaging Radiometer Suite (VIIRS) aboard the Suomi NPP satellite captured these true-color images of the dust cloud on February 21 and 22:

Credit: NASA/NOAA/DoD Suomi NPP/VIIRS. Acquired: February 21, 2017



Credit: NASA/NOAA/DoD Suomi NPP/VIIRS. Acquired: February 22, 2017

It might seem small, but atmospheric dust is a big deal.

Consisting (mostly) of tiny pieces of metal oxides, clays and carbonates, dust is the single largest component of the aerosols in Earth's atmosphere, and it likely has a significant impact on the Earth's climate, as it effects a wide range of phenomena, including from temperatures in the Atlantic Ocean to the rate of snowmelt in the southwestern U.S., NOAA explains. Dust may also affect hurricanes, as recent research based on data sets dating back to the 1950s suggests an inverse relationship between dust in the tropical North Atlantic and the number of Atlantic hurricanes during the past several decades. Improving our ability to detect dust in the atmosphere is beneficial because just how much dust enters the atmosphere each year is unclear – projections range from 200 to 5 000 teragrams a year (a teragram, Tg, equals one trillion grams), the agency said.

Scientists estimate that, on average, about 20 Tg of dust are suspended in the atmosphere at any given time, but seasonal variability is common. Inter-annual variability is also a factor, as ocean-related weather phenomena such as the North Atlantic Oscillation and El Niño have been associated with greater Saharan dust transport across the Atlantic.

Lake Chad, which sits just below it in the north-central part of Africa, is the Earth's largest single source of atmospheric dust. In fact, about half of the dust suspended in Earth's atmosphere originates in North Africa, due to both the abundance of dust sources there and the region's position under the subtropical jet stream, which carries dust around the world. The rest is said to come from just a handful of other well-known dust-producing regions, including northwestern China's Taklimakan Desert, parts of Arabia, Iran, the shore of the Caspian Sea, the Lake Eyre Basin in Australia, and the area around Utah's Great Salt Lake.

Atmospheric dust arises from these locations because they all share a common trait: they all sit in low-elevation basins near or surrounded by mountains, which feed rivers that deposit large amounts of sediment in these low-lying areas. These particle-producing places also tend to be completely flat and devoid of significant (or any) vegetation cover, two features that allow winds to build momentum and drive more dust into the atmosphere.

How long dust hangs around in the atmosphere depends on the size of the individual particles. Particles with radii between 0.1 and 1.0 micrometers (a micrometer is one-millionth of a meter) can stay aloft for 20 or more days. Larger dust particles with radii between five and 10 micrometers usually fall out of the sky within 24 hours.

On February 18 and 19, dust storms enveloped the countries bordering the Persian Gulf. The storm temporarily cut off power to much of the Iran's oil-rich Khuzestan province, reduced oil production by 700 000 barrels per day and sparked protests against local officials, Albawaba reports.

Dust storms can also have a major impact on human health, particularly the respiratory system. "A dust storm consists of a massive amount of particulates in the air, and when people breathe it, these can get down their lungs and cause respiratory illness and heart disease and so on," said Diarmid Campbell-Lendrum, a health and climate change expert with the WHO.

The above-mentioned storm forced 218 people in Iran to be hospitalized due to respiratory problems. Their officials said the dust storms of the region originate in Iraq, Saudi Arabia, Jordan and Syria, and urged authorities in those countries to combat the problem with irrigation projects and other measures.

According to Enric Terradellas, a meteorologist with the WMO's sand and dust storm prediction center for the Middle East, there has been a significant increase in the frequency and the intensity of sand and dust storms in the region in the past 15 years or so.

"One of the main sources of sand and dust storms is Iraq, where the flow of rivers has decreased because of a race in dam constructions in upstream countries. That has led to the disappearance of marshes and drying up of lakes both in Iraq and Iran, and the sediments left behind are very important source of dust in the region," Terradellas said.

In May 2016, Amin Baqeri, the governor of Rigan, Iran's southeastern province of Kerman, said 16 villages in Rigan were buried in sand and became completely deserted amid consistent sand storms. "Massive sand influx and consistent sand storms have led to the complete disappearance of the villages under piles of sand. Agriculture and livestock are totally ruined in this area, and it suffered a loss of nearly $9 million USD (320 billion rials). 80 other villages are also endangered and might become subjected to be deserted too," Baqeri warned.

In September 2015, a severe sand storm engulfed much of the Middle East. It caused at least 12 casualties and sent nearly 1 000 to hospitals across the region. According to the Lebanese Health Ministry, hundreds of people were hospitalized with breathing problems and two women have died. The meteorological department at Beirut's Rafik Hariri International Airport described the storm as being "unprecedented" in Lebanon's modern history.

EVENT: Clouds and dust engulf Denver International Airport, March 2017

A powerful frontal passage moved through Denver, Colorado Monday morning, March 6, 2017 producing damaging winds and blinding snow squalls. Strong winds produced significant damage throughout the Denver Metro Area and grounded flights at Denver International Airport. Wind gusts of up to 80 km/h (50 mph) and dry conditions in the area caused to dust to pick up and engulf the airport. Due to high winds and forecasted winds in Denver through mid-afternoon, some flights have been canceled. The high winds and low humidity have also prompted Red Flag Warnings for fire danger across all of Eastern Colorado.

Winds across Denver eventually reached up to 130 km/h (80 mph) and produced significant damage. Video below shows a power pole that snapped in half and fell on top of a Ford Truck, crushing the front end and damaging the windshield. Blinding snow squalls affected the morning commute for millions.

EVENT: Major dust storm engulfs northern China, Beijing, May 2017

A major dust storm was blowing across northern China today, May 4, 2017, turning the sky yellow, dragging down air quality and causing travel disruptions. The storm reached capital Beijing, where weather authorities issued this year's first dust and sand alert (blue). Visibility dropped as low as 1 km (0.62 miles) in many parts of Bejing today, as a major dust storm from Mongolia hit large swathes of northern China, Xinhua reports. Most monitoring stations in the city showed PM10 readings of more than 1 000 µg/m3 (micrograms per cubic meter) as of 04:00 local time. Later in the morning, the reading dropped to around 900. The World Health Organization air quality guidelines (AQG) recommend 50 µg/m3 of PM10 as a 24-hour mean and 20 µg/m3 as an annual mean.

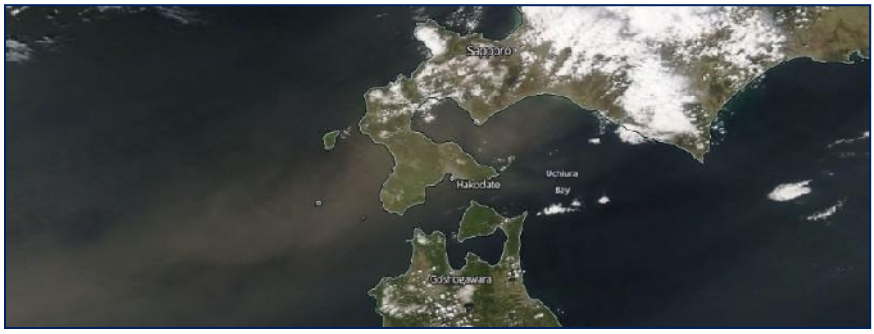
According to Reuters, official data from the Beijing government showed average readings of PM2.5 had risen to 630 µg/m3 in parts of the city by Thursday morning, though it dropped slightly later in the day. WHO's guideline for PM2.5 is 25 µg/m3 as a 24-hour mean and 10 µg/m3 as an annual mean.

Particulate matter (also called particle pollution) contains microscopic solids or liquid droplets so small that they can cause serious health problems if inhaled. Particles less than 10 micrometers in diameter pose the greatest problems because they can get deep into lungs and bloodstream.

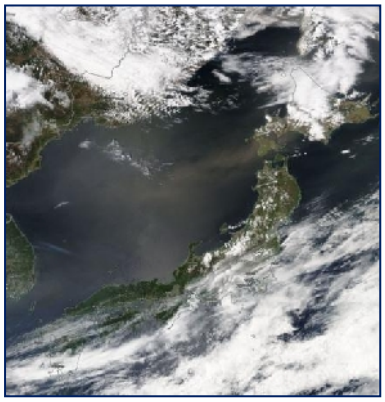
Officials urged residents of affected regions to avoid outdoor activities as much as possible, especially old people and children. Many pedestrians in downtown Beijing were later seen wearing protective masks and bandanas.

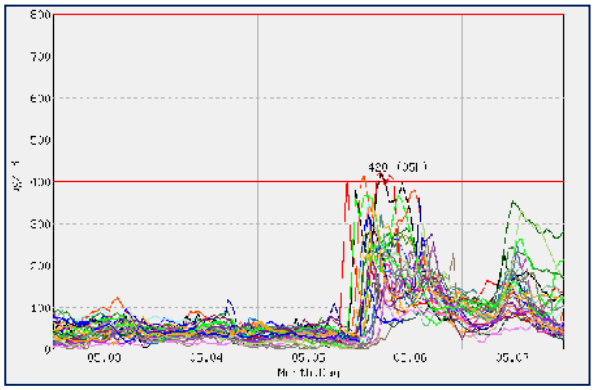
The Beijing Capital International Airport said 48 flights were canceled early Thursday, including six international routes in Asia and Russia. The dust storm is expected to persist in Beijing, as well as Gansu, Hebei, Heilongjiang, Jilin, Shaanxi and Shanxi provinces through the end of Thursday and into Friday, May 5. The meteorological phenomenon called Asian Dust, also known as yellow dust, yellow sand, yellow wind or China dust storms, regularly affects much of East Asia, especially during the spring months. Originating in the deserts of northern China, Kazakhstan and Mongolia, these clouds of dust and sand are then carried eastward where they can reach as far as Japan, Russian Far East and sometimes even the United States.

EVENT: Asian Dust blankets Korean Peninsula and wide swath of Japan, May 2017



After engulfing a large part of northern China, including capital Beijing on Thursday, May 4, 2017, dust storm from Mongolia reached the Korean Peninsula and Japan over the weekend. In China, the storm reduced visibility to less than 1 km (0.62 miles) and forced authorities in Beijing to issue a high yellow dust alert, the first dust and storm alert this year. The dust storm flew into China from the Gobi Desert in Mongolia late Wednesday into Thursday, May 4, extending to over 1.6 million km2 (617 763 mi2) and affecting more than 40 provinces, cities and districts. Most monitoring stations in Beijing showed PM10 readings of more than 1 000 µg/m3(micrograms per cubic meter) as of 04:00 local time, for the first time since April 15, 2015. Later in the morning, the readings dropped to around 900. The World Health Organization air quality guidelines (AQG) recommend 50 µg/m3 of PM10 as a 24-hour mean and 20 µg/m3 as an annual mean. Official data from the Beijing government showed average readings of PM2.5 had risen to 630 µg/m3 in parts of the city by Thursday morning, though it dropped slightly later in the day. WHO's guideline for PM2.5 is 25 µg/m3 as a 24-hour mean and 10 µg/m3 as an annual mean. The storm reached the Korean Peninsula late May 5 (local time) where highest PM10readings reached 420 µg/m3 in Baengnyeongdo and Gyegryelbi-do during the early morning hours on Saturday, May 6. The levels dropped during the day and again increased on Sunday, May 7, especially in Heuksando and Gunsan.





PM10 readings, South Korea. Credit: Korea Meteorological Administration

Dust storm reaches Japan on May 7, 2017. Credit: NASA Aqua/MODIS

"With pollen levels having reached the zenith on top of heavy yellow dust hitting the country, patients with respiratory diseases must use extra caution to maintain health," the Korea Meteorological Administration said.

In Japan, the dust first reached the city of Matsue and soon stretched over a wide area from western to northern Japan and parts of the Kanto region on Sunday, May 7. Sand-laden air was observed in Hokkaido, the Tohoku, Chubu and Kansai regions, and Kyushu. It was also seen in Gunma and Ibaraki prefectures, according to The Japan Times. The airborne sand was observed in

western Japan on Saturday for the first time this year, the latest date since 1967 when information about sandstorms began to be compiled in this country, it said.

The effects are expected to continue on Monday, mainly in western Japan where transport disruptions are possible, the Japan Meteorological Agency warned.

EVENT: Huge plume of Saharan dust over the Atlantic Ocean, May 2017

This week's strong winds lofted a huge dust plume from western Africa and carried it toward the northeast into Europe and west toward Cabo Verde Islands. The event, reached far into eastern Europe and over the Atlantic Ocean.

While very high load of dust is expected to affect the entire southern Italy at least until Saturday night, May 13, models suggest the event will continue affecting the region until Tuesday, May 16, when the sky over southern Italy should be completely clear. At the same time, for the fourth day in a row, large amounts of dust are being pushed over the Atlantic Ocean toward Cabo Verde, the Carribean and South America. NASA's MODIS instrument aboard Terra satellite acquired this natural-color image of airborne sand and other aerosols at 12:10 UTC on May 9.

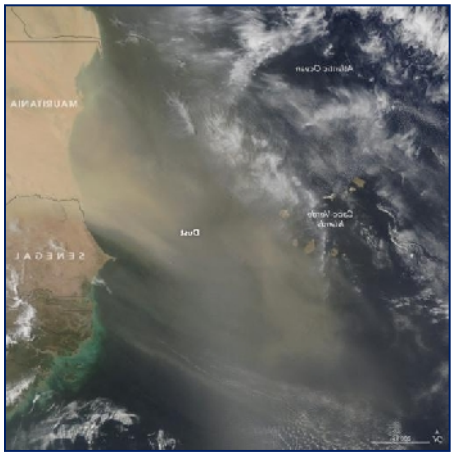


Image credit: NASA Terra/MODIS. Acquired 12:10 UTC, May 9, 2017. Edit: Jeff Schmaltz, LANCE/EOSDIS Rapid Response

About 30 minutes after MODIS captured this image, astronauts on the International Space Station (ISS) passed over the region and recorded the event with their High Definition Earth Viewing (HDEV) video camera.

EVENT: Severe dust storm leaves 7 dead, 65 injured in Punjab, Pakistan, June 2017

A severe dust storm hit Pakistan's province of Punjab late Thursday, June 8, 2017, leaving at least 7 people dead and 65 injured.

The storm downed billboards, trees and power lines, disrupting life in the entire province, local media reported. According to the Dawn, winds associated with the storm in south Punjab were as high as 195 km/h (121 mph). Power supply to a majority of rural areas was not restored even after 24 hours of the storm.

At least 7 people were killed, including six in Bahawalnagar district alone. A minor girl and her family member died after outer walls of their house fell on them. Two people were killed when the minaret of a mosque collapsed. Another person, an unknown youth, was killed after strong winds knocked down live electricity wire, killing the person on spot.

According to The News, at least 65 people, many of them children and women, were injured as a furious storm hit the area. The administration declared an emergency in DHQ Hospital Bahawalnagar and called in all the doctors to tackle with a large number of injured.

According to the spokesperson for the DPO Bahawalnagar, the entire police force was on rescue – a process hampered by the suspension of power supply.

EVENT: Dust storm causes 25-vehicle pile-up in New Mexico, multiple deaths and injuries, June 2017

A multi-vehicle pile-up on the Interstate-10 West in Lordsburg, near the Arizona - New Mexico border, late Monday, June 19, 2017 resulted in deaths of at least 6 people. The chain-reaction crash happened near milepost 11 and is being attributed to high winds and a dust storm, the New Mexico State Police said. Preliminary information from the investigation indicates that 18 commercial motor vehicles and seven passenger cars were involved. At least 6 people were killed and several injured.

New Mexico State Police is continuing to investigate the crash. According to the Arizona Department of Transportation, the I-10 was closed for about 96 km (60 miles), with eastbound traffic stopped at milepost 352, in response to blowing dust and the crash.

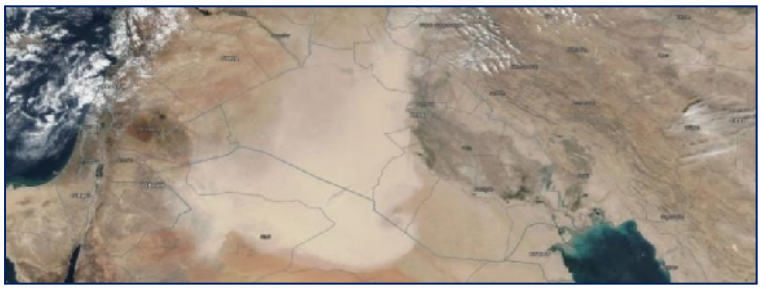
EVENT: Massive dust storm sweeps across northern Algeria, September 2017



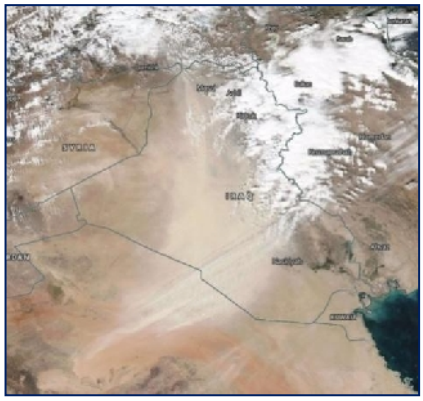
A massive dust storm swept through northern Algeria's provinces of Djelfa, Laghouat, and Tiaret on Friday, September 15, *2017.*

The storm was caused by strong thunderstorms and powerful south-west winds. A weather station in Tiaret Province, near the city of Hassi Bahbah, registered wind speed of 60 km/h (37 mph) and gusts of 90 km/h (56 mph).

EVENT: Massive dust and sand storm hits Middle East, sending hundreds to hospitals, October 2017



A massive dust and sand storm swept over northern Saudi Arabia, Syria, parts of Jordan and much of Iraq on October 29, 2017, significantly reducing visibility and sending a large number of people to hospitals. In Kurdistan Region's capital city of Erbil (Iraq), the visibility was dropped to less than 300 m (984 feet), officials said. "Since Saturday night, the Kurdistan Region has come under a heavy dust storm reducing visibility to a large extent," said Fazil Ibrahim, head of Earthquake and Metrology Department. "The sight distance inside Erbil is less than 300 meters."



Dr. Khalil Qadir, spokesperson of the Health Ministry told Rudaw English that a large number of people admitted were those already suffering from other chronic illnesses and were hospitalized at the emergency hospitals due to the dust.

"The total number of cases who visited emergency hospitals in Erbil was 485 cases. So far, 153 cases have been admitted and managed. In Sulaimani and Duhok, there were no cases," said Qadir.

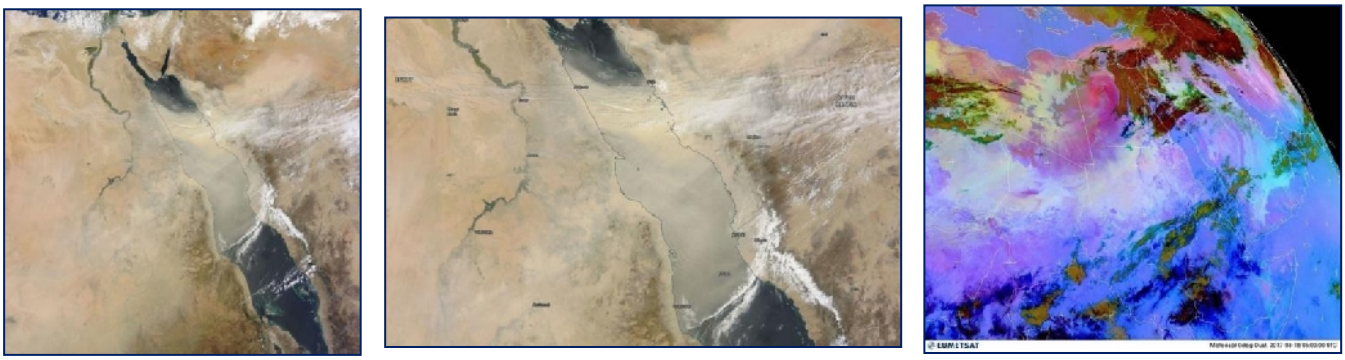
The Visible Infrared Imaging Radiometer Suite (VIIRS) aboard

the NOAA/NASA Suomi NPP satellite captured this true-color image of a massive dust and sand storm on October 29, 2017. The desert regions of the Middle East contribute to annual dust storms like this one, which is reported to have originated in northern Syria and Iraq. VIIRS acquired this data as three spectrum channels sensitive to red, green and blue (or RGB) wavelengths of light, composed here as an image. In addition, atmospheric interference analyses using several other channels cancel out or correct blurry parts of the image. Although less intense, the storm was still spreading over much of Iraq and northern Saudi Arabia on Monday, October 30.

Dust and sand storm over Iraq and northern Saudi Arabia on October 30, 2017. Credit: NASA/NOAA Suomi NPP / VIIRS

EVENT: Impressive sandstorm sweeps through Saudi Arabia, March 2017

An impressive sandstorm swept through Saudi Arabia's northern city of Sakaka on Saturday, March 18, 2017, and was captured on video. On Sunday, an "advance alert" was issued following a sandstorm that hit the western city of Jeddah and other areas of Saudi Arabia. Hussein Al-Qahtani, official spokesperson of the General Authority of Meteorology and Environmental Protection (PME), told Arab News that Jeddah was on advance alert this morning but the condition is mild now. Jeddah's case is the lowest on the scale of climate severity, he added. The sandstorm, named "Madar" by the Committee for Naming Saudi Climate Conditions, caused obscured visibility of below 1 km (0.62 miles). This mainly affected drivers heading to work in the morning rush hour. The areas affected by the storm were Qassim, the Eastern Province, Riyadh, Northern Borders, Madinah and parts of Makkah Province, which includes Jeddah.



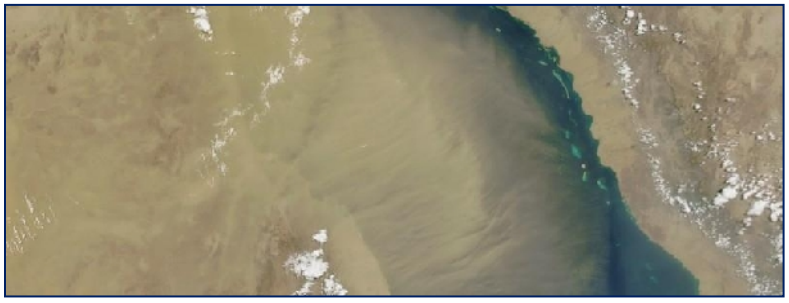
Sandstorm Saudi Arabia on March 19, 2017. Credit: NASA Terra/MODIS

The dusty weather in Jeddah and other areas in the Kingdom was caused by a sandstorm that hit the Libyan desert in the past few days, and then passed through Egypt, the paper said.

"We are in a transitional phase when changes in weather are expected," Al-Qahtani said.

People with asthma and respiratory problems are advised to stay home in such weather.

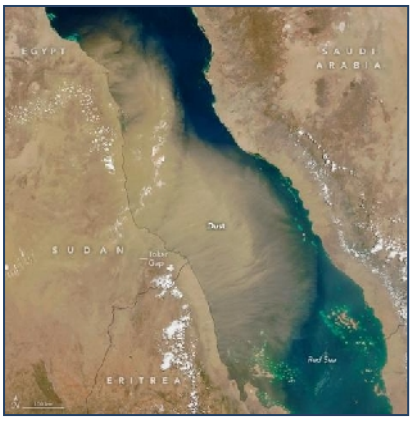
EVENT: Significant increase in frequency and intensity of sandstorms in the Middle East over the past 15 years, June 2017



A significant increase in frequency and the intensity of sand and dust storms has been observed in the Middle East over the past 15 years. Although the Middle East has been the worst hit, with Iran and Kuwait the most affected, meteorologists say they are now also happening in new places like some parts of Central Asia. According to Enric Terradellas, a meteorologist with the WMO's sand and dust storm prediction center for the Middle East, there has been a significant increase in the frequency and the intensity of sand and dust storms in the region in the past 15 years or so.

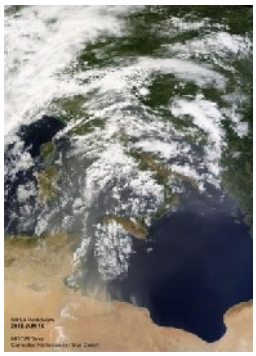
"One of the main sources of sand and dust storms is Iraq, where the flow of rivers has decreased because of a race in dam constructions in upstream countries. That has led to the disappearance of marshes and drying up of lakes both in Iraq and Iran, and the sediments left behind are very important source of dust in the region," Terradellas said. The United Nations Environment Programme (UNEP) has predicted that Iraq could witness 300 dust events in a year within 10 years, up from around 120 per year now. On June 15, 2016, a large sandstorm was produced over the Red Sea. The transport was seen from the wide coastal area, but the plume was especially dense over the Tokar Delta, said Georgiy Stenchikov of King Abdullah University of Science and Technology.

Gaps in near-coastal mountain ranges become pathways through which winds can carry dust and sand from inland areas toward the sea. For example Tokar Gap - located about 50 km (30 miles) inland - funnels winds toward the southeast from June to September. These winds spread dust from the Tokar Delta out over the Red Sea and toward the Arabian Peninsula.



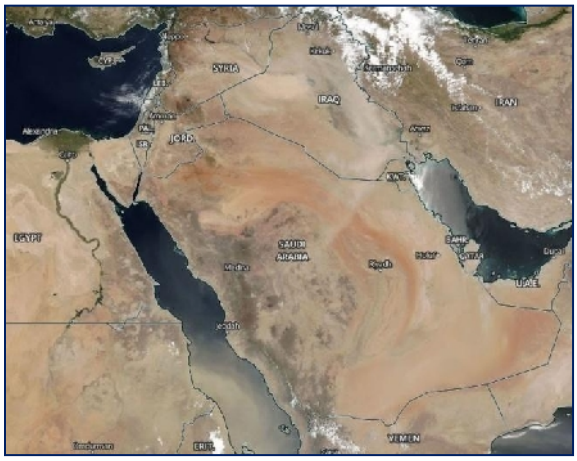
Dust storm over the Red Sea on June 15, 2016. Image credit: Jeff Schmaltz, LANCE/EOSDIS Rapid Response. Caption by Kathryn Hansen.

Saharan sand is also spreading to the west, across the Atlantic, and to the north, reaching all parts of Europe. One of such events is currently active over southern Europe. If you live there, you might have noticed African sand on your car following recent rains. It's coming from Tunisia and Libya.



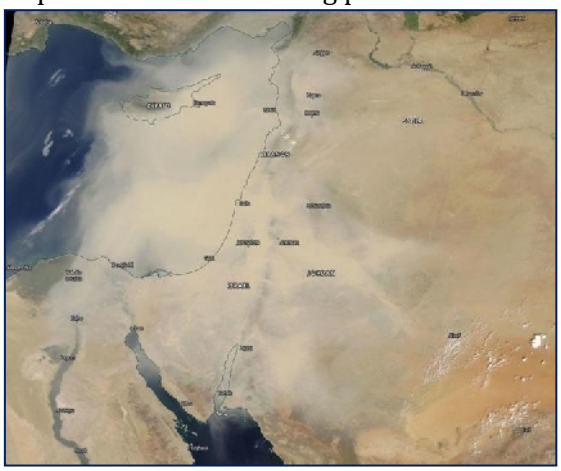
Dust storms affect the climatic and other environmental processes of the planet, but they also have a major impact on human health, particularly the respiratory system. "A dust storm consists of a massive amount of particulates in the air, and when people breathe it, these can get down their lungs and cause respiratory illness and heart disease and so on," said Diarmid Campbell-Lendrum, a health and climate change expert with the WHO.

14 Iranian provinces, including Teheran, were affected by dust storms, the Iranian health department said. "The air is so polluted here and I have developed breathing problem," Jasem, a businessman in Ahvaz in southwest Iran told the BBC, coughing over the phone. "Coughing is usual thing for me now and we need to keep the windows closed and use the air-conditioner all the time."



Sandstorm over the Red Sea, Saudi Arabia, Iraq, Iran, and Syria on June 16, 2016. Credit: NASA/NOAA/DoD Suomi NPP / VIIRS

In May 2016, Amin Baqeri, the governor of Rigan, Iran's southeastern province of Kerman, said 16 villages in Rigan were buried in sand and became completely deserted amid consistent sandstorms. "Massive sand influx and consistent sandstorms have led to the complete disappearance of the villages under piles of sand. Agriculture and livestock are totally ruined in this area, and it suffered a loss of nearly $9 million USD (320 billion rials). 80 other villages are also endangered and might become subjected to be deserted too," Baqeri warned. In September 2015, a severe sandstorm engulfed much of the Middle East. It caused at least 12 casualties and sent nearly 1 000 to hospitals across the region. According to the Lebanese Health Ministry, hundreds of people were hospitalized with breathing problems and two women have died. The meteorological department at Beirut's Rafik Hariri International Airport described the storm as being "unprecedented" in Lebanon's modern history.



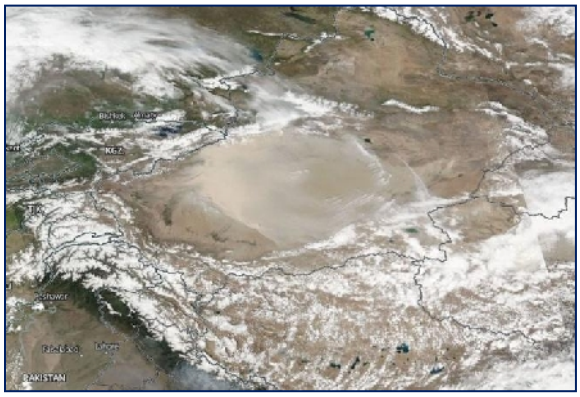
In Syria, the sandstorm disrupted the fighting and air strikes and caused dozens of suffocation cases, including 3 casualties. According to the Syrian Observatory for Human Rights, hospitals in the city of al-Mayadin, in the province of Deir Ezzor, stopped to receive relief cases because there were no oxygen cylinders.

Sandstorm affecting the Middle East on September 8, 2015. Image credit: NASA

Terra/MODIS

"Sand-dust storms, especially serious-strong sand or dust storms are hazardous weather events with extreme calamity. When they occur, they can move forward like an overwhelming tide and the strong winds take along drifting sands that cover farmlands, damage young crop plants and result in a loss of production", explained Dr. Wadid Erian, Prof. of Soil Science at Cairo University and Senior Advisor on Climate Change Adaptation and Disaster Risk Reduction at the League of Arab States. "Sandstorms accelerate the process of land desertification and cause serious environment pollution with huge destruction to ecology and the living environment," he added.

In Asia, the dust and sand from Mongolia and the Gobi desert reach China, the Korean peninsula, and Japan. However, with the Aral Sea drying up, the problem is also increasing in Kazakhstan and Mongolia, WMO's sand and dust storm expert Alexander Baklanov said.



Major sandstorm over eastern China on May 1, 2016. Image credit: NASA/NOAA/DoD Suomi NPP / VIIRS.

According to the WHO, dust storms contribute to poor air quality that is blamed for the death of 7 million people every year.

EVENT: Massive sandstorm sweeps through Khartoum, Sudan, June 2017

A massive sandstorm swept through the Sudanese capital Khartoum on June 1, 2017, turning day into night and burying several homes.

The storm has brought vast amounts of sand and dust into the city, burying several homes and severely limiting visibility, CGTN reported. "Ecosystems and natural resources in the country have been deteriorating due to climate change. Water supplies are scarce and severe droughts are common. After years of desertification, the country's rich biodiversity is under threat and drought has hindered the fight against hunger," the paper said.

Wild fires

Category: Natural, sometimes aggravated by Humans

EVENT: Chile wildfires, January 2017

Statistics	
Total fires	**2,977 (As of January 27, 2017)**
Total area	**1,250,000 acres (5,059 km^2)**
Buildings destroyed	**1000+**
Fatalities	**11**

The 2017 Chile wildfires are a series of wildfires that burned across Chile during January 2017.

On January 27–28, a wildfire described as the worst in Chile's modern history killed at least 11 people, including five firefighters and destroyed the town of Santa Olga in the central Maule Region, displacing thousands of people.On January 20, the Chilean government declared a state of emergency in response to the wildfires.

Chilean President Michelle Bachelet cancelled her planned visit to Punta Cana, Dominican Republic, for the fifth CELAC Summit on January 24–25 due to the wildfires.

EVENT: California wildfires, April- December 2017

Statistics	
Total fires	**9,133**
Total area	**1,381,405 acres (5,590.35 km^2)**
Fatalities	**1 firefighter, 45 civilians**
Non-fatal injuries	**12 firefighters, 199 civilians**

The 2017 California wildfire season was the most destructive wildfire season on record, which saw multiple wildfires burning across California. A total of 9,133 fires burned 1,381,405 acres (5,590.35 km2), according to the California Department of Forestry and Fire Protection, including five of the 20 most destructive wild land-urban interface fires in the state's history.

Throughout the early months of 2017, there was heavy rainfall over most of California, which triggered widespread flooding, thus temporarily mitigating the state's severe drought conditions. However, according to a report published by the National Interagency Fire Center, the potential for large fires was "expected to remain near normal through the spring, but once fine fuels dry out, there will likely be a spike in grass fire activity."

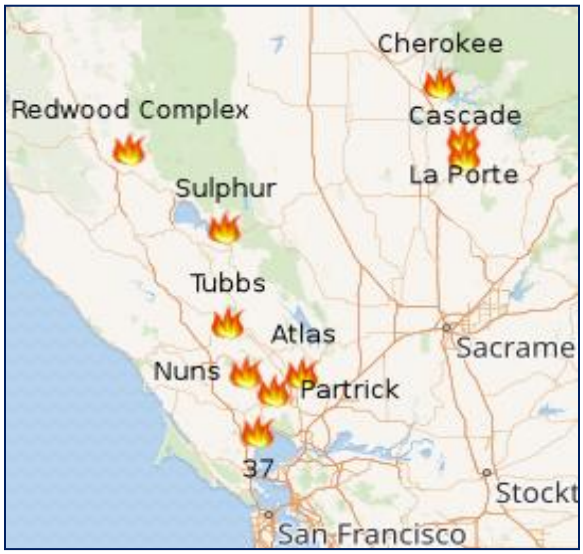
In October 2017, 250 wildfires ignited across Northern California, burning over 245,000 acres (990 km2), and causing more than $9.4 billion (2017) in insured property losses, becoming the costliest group of wildfires on record. It will take at least several months, and likely years to fully recover from the devastating wildfires that ripped through Northern California in October, which destroyed at least 8,900 structures and killed 44 people, according to Sonoma County officials. In addition, the Northern California fires hospitalized or injured at least 192 other people.

In December 2017, strong Santa Ana winds triggered a new round of wildfires, including the massive Thomas Fire in Ventura County. The December 2017 fires forced over 230,000 people to evacuate, with the 6 largest fires burning over 307,900 acres (1,246 km2) and more than 1,300 structures.

During the year, 5 of the 20 most destructive wildfires in the state's history burned between October and December: #1 Tubbs, #6 Nuns, #7 Thomas, #11 Atlas, and #17 Redwood Valley Complex.[15] On December 8, AccuWeather predicted that the total economic toll of the 2017 California wildfire season will reach at least $180 billion (2017 USD).

In 2014, a study found a human fingerprint in growing California wildfire risks. The paper is titled "Extreme fire season in California: A glimpse into the future?" It was published as the second chapter of "Explaining Extreme Events of 2014", by the American Meteorological Society. The authors also projected into the future, and the predicted results showed increases in the drought index, the area under extreme threat of fires, and the days of fire danger, stating that, "The increase in extreme fire risk is expected within the coming decade to exceed that of natural variability and this serves as an indication that anthropogenic climate warming will likely play a significant role in influence California's fire season."

This section contains a map of the locations and burn areas of the fires that occurred during the largest outbreaks of the season. The burn areas of some major fires are included in some of the maps



Location of the California wildfires in October 2017

Location of the California wildfires in December 2017

October Northern California wildfires

During the month of October, a series of wildfires broke out throughout Napa, Lake, Sonoma, Mendocino, and Butte counties during severe fire weather

conditions, effectively leading to a major red flag warning from much of the northern California area. In the extreme conditions, shortly after the fires ignited, they rapidly grew to become massive conflagrations spanning from 1,000 to well over 20,000 acres apart within a single day. In addition, the fires have destroyed an estimated 8,900+ structures, and killed at least 44 people.[8] The fires burned over 245,000 acres (99,148 ha) of land, and forced over 20,000 people to evacuate.

December Southern California wildfires

Multiple wildfires ignited in December across Los Angeles, San Bernardino, Ventura, San Diego, Riverside, Santa Barbara Counties. The fires were exacerbated by unusually powerful and long-lasting Santa Ana winds, as well as large amounts of dry vegetation grown, due to large amounts of precipitation earlier in the year. The fires burned over 307,900 acres (1,246 km2), and caused traffic disruptions, school closures, hazardous air conditions, and massive power outages. California Governor Jerry Brown declared a state of emergency in Ventura and Los Angeles Counties, and Los Angeles Mayor Eric Garcetti declared a state of emergency for the city. The largest fire was the Thomas Fire, which grew to 281,893 acres, becoming California's largest modern wildfire.

Name	County	Acres	Start Date	Containment Date	Status	Damages
Jayne	Fresno	5,738	April 20, 2017	April 21, 2017	Contained	
Opera	Riverside	1,350	April 30, 2017	May 2, 2017	Contained	
Elm	Fresno	10,345	May 18, 2017	May 21, 2017	Contained	
Gate	San Diego	2,056	May 20, 2017	May 23, 2017	Contained	
Oakwood	Madera	1,431	June 10, 2017	June 13, 2017	Contained	
Highway	Kern	1,522	June 18, 2017	June 28, 2017	Contained	
Holcomb	San Bernardino	1,503	June 19, 2017	June 29, 2017	Contained	

Schaeffer	Tulare	16,031	June 24, 2017	August 10, 2017	Contained	
Salmon August Complex	Siskiyou	65,888	June 25, 2017	December 8, 2017	Contained	
Manzanita	Riverside	6,309	June 26, 2017	June 30, 2017	Contained	
Hill	San Luis Obispo	1,598	June 26, 2017	June 30, 2017	Contained	50 homes destroyed
Winters	Yolo	2,269	July 6, 2017	July 12, 2017	Contained	
Alamo	San Luis Obispo	28,687	July 6, 2017	July 19, 2017	Contained	1 home destroyed, 1 damaged
Wall	Butte	6,033	July 7, 2017	July 17, 2017	Contained	41 homes, 48 outbuildings destroyed, 10 damaged
Whittier	Santa Barbara	18,430	July 8, 2017	October 5, 2017	Contained	16 homes, 30 outbuildings destroyed, 7 damaged
Parkfield	Monterey	1,816	July 8, 2017	July 11, 2017	Contained	
Garza	Fresno	48,889	July 9, 2017	July 21, 2017	Contained	1 structure destroyed
Long Valley	Lassen	83,733	July 11,	July 21, 2017	Contained	

			2017			
Detwiler	Mariposa	81,826	July 16, 2017	August 24, 2017	Contained	63 homes, 68 structures destroyed (131 total), 21 damaged
Modoc July Complex	Modoc	83,120	July 24, 2017	August 16, 2017	Contained	
Orleans Complex	Siskiyou	27,276	July 25, 2017	September 26, 2017	Contained	
Empire	Mariposa	6,370	August 1, 2017	November 27, 2017	Contained	
Parker 2	Modoc	7,697	August 3, 2017	August 29, 2017	Contained	
Young	Siskiyou	2,500	August 7, 2017	August 28, 2017	Merged into the Eclipse Complex's Oak fire	
South Fork	Mariposa	7,000	August 13, 2017	November 27, 2017	Contained	
Blaine	Riverside	1,044	August 13, 2017	August 16, 2017	Contained	
Eclipse Complex	Siskiyou	78,698	August 15, 2017	November 29, 2017	Contained	
Pier	Tulare	36,556	August 29, 2017	November 29, 2017	Contained	

Railroad	Madera	12,407	August 29, 2017	October 24, 2017	Contained	5 homes, 9 structures destroyed
Ponderosa	Butte	4,016	August 29, 2017	September 9, 2017	Contained	32 homes, 22 outbuildings, 15 damaged
Mud	Lassen	6,042	August 29, 2017	September 1, 2017	Contained	
Slinkard	Mono	8,925	August 29, 2017	September 12, 2017	Contained	
Helena	Trinity	21,846	August 30, 2017	November 15, 2017	Contained	133 structures destroyed
La Tuna	Los Angeles	7,194	September 1, 2017	September 9, 2017	Contained	5 homes, 5 structures destroyed
Palmer	Riverside	3,874	September 2, 2017	September 6, 2017	Contained	
Mission	Madera	1,035	September 3, 2017	September 13, 2017	Contained	4 structures destroyed
Buck	Trinity	13,417	September 12, 2017	November 20, 2017	Contained	
Lion	Tulare	18,900	September 24, 2017	December 2, 2017	Contained	
Canyon	Riverside	2,662	September 25, 2017	October 4, 2017	Contained	6 structures damaged

Cherokee	Butte	8,417	October 8, 2017	October 16, 2017	Contained	
Atlas	Napa/Solano	51,624	October 8, 2017	October 31, 2017	Contained	6 fatalities, 785 structures destroyed, 40 damaged
Tubbs	Napa/Sonoma	36,807	October 8, 2017	October 31, 2017	Contained	22 fatalities, 1 injured, 5,643 structures destroyed
Nuns	Sonoma	56,556	October 8, 2017	October 30, 2017	Contained	Merged with the Norrbom, Adobe, Partrick, Pressley, and Oakmont Fires. 3 fatalities, 1,200 structures destroyed
Redwood Valley Complex	Mendocino	36,523	October 8, 2017	October 28, 2017	Contained	9 fatalities, 43 injured, 545 structures destroyed
La Porte	Butte	6,151	October 9, 2017	October 18, 2017	Contained	
Cascade	Yuba	9,989	October 9, 2017	October 18, 2017	Contained	4 fatalities, 143 residential, 123 outbuildings destroyed
Sulphur	Lake	2,207	October 9, 2017	October 26, 2017	Contained	150 structures destroyed
Canyon 2	Orange	9,217	October 9, 2017	October 18, 2017	Contained	25 structures destroyed, 55

						structures damaged
37	Sonoma	1,660	October 9, 2017	October 13, 2017	Contained	
Pocket	Sonoma	17,357	October 9, 2017	October 31, 2017	Contained	
Lobo	Nevada	821	October 9, 2017	October 18, 2017	Contained	At least 30 structures destroyed
Bear	Santa Cruz	391	October 16, 2017	October 27, 2017	Contained	7 injuries, 4 structures destroyed
Buffalo	San Diego	1,088	October 17, 2017	November 14, 2017	Contained	
Tank	Kern	50	October 25, 2017	October 27, 2017	Contained	
Wildomar	Riverside	866	October 27, 2017	October 29, 2017	Contained	
Thomas	Ventura	281,893	December 4, 2017	January 12, 2018	Contained	1,063 structures destroyed, 280 structures damaged, 2 firefighters injured, 1 firefighter and 1 civilian killed
Creek	Los Angeles	15,619	December 5, 2017	January 9, 2018	Contained	123 buildings destroyed, 81 buildings damaged, 3

						firefighters injured
Rye	Los Angeles	6,049	December 5, 2017	December 12, 2017	Contained	6 buildings destroyed, 3 structures damaged, 1 firefighter injured
Little Mountain	San Bernardino	260	December 5, 2017	December 7, 2017	Contained	3 injuries
Skirball	Los Angeles	422	December 6, 2017	December 15, 2017	Contained	6 structures destroyed, 12 structures damaged, 3 firefighters injured
Lilac	San Diego	4,100	December 7, 2017	December 16, 2017	Contained	157 structures destroyed, 64 structures damaged, 3 firefighters and 4 civilians injured
Liberty	Riverside	300	December 7, 2017	December 9, 2017	Contained	7 structures destroyed
Range 219	San Diego	100	December 15, 2017	December 15, 2017	Contained	

EVENT: Cape storm, June 2017

Type	**Extratropical cyclone, Winter storm**
Formed	**June 2017**
Highest gust	**120 km/h (75 mph)**
Total fatalities	**8 (storm)** **7 (Knysna fires)** **15 total deaths**
Areas affected	**Western Cape, Eastern Cape, Northern Cape**

An unusually large large south Atlantic storm struck the southern coast of South Africa on the 7 June 2017 with wind speeds as high as 120 km/h. Wave heights of 9–12 metres were recorded between Cape Columbine and Cape Agulhas. The storm directly caused eight deaths and damaged 135 schools across the Western Cape. Around 800 homes were flooded across the city of Cape Town due to the storm.

Despite dropping up to 50 mm of rain the storm did not break the Cape Town water crisis affecting the region.

Knysna fires

A screen shot of video footage taken of the Knysna fire looking towards the Phantom Pass on the 7th June 2017.

High winds of 50 km/h caused by the storm fueled around 20 to 30 significant fires that swept through the town of Knysna and surrounding areas in the days after the storm. The fires killed seven people] and displaced around 10,000 with around 600 structures in Knysna and Plettenberg Bay being destroyed.

The fires were notable for involving the largest deployment of firefighters in South Africa to that date. A total of 985 firefighters along with 78 vehicles, ten helicopters, and two fixed winged aircraft were used in combating the fire between 6 June and 10 June 2017. It is estimated that the fires caused between R4 billion and R5 billion (around US$297 million to US$372 million) in damages to private property with an additional R136 million worth of damage done to public infrastructure.

Unofficial preliminary conjecture suggests that some of the fires might have been lit by arsonists

EVENT: British Columbia wildfires, July 2017

Statistics	
Cost	Unknown
Date(s)	Evacuations: July 6, 2017 – September 20, 2017[1] Provincial state of emergency: July 7, 2017 – September 15, 2017
Burned area	1,215,494[2] hectares (3,003,550 acres) as of December 5, 2017[2]
Cause	Lightning and man made
Land use	Forest and residential
Buildings destroyed	Unknown, at least 305
Fatalities	0
Non-fatal injuries	Unknown
Motive	unknown

Ashcroft Reserve wildfire burning at Loon Lake, BC

On July 6, 2017, a two-hectare wildfire began west of 100 Mile House, British Columbia, Canada marking the beginning of the 2017 wildfire season in British Columbia. On July 7, 56 new fires started throughout British Columbia (BC) leading to the release of several evacuation alerts, orders and the declaration of a provincial state of emergency by the Government of British Columbia. As of September 12, there are 158 fires currently burning throughout the province. The 2017 fire season is notable for three reasons; first, for the largest total area burnt in a fire season in recorded history; second, for the largest number of total evacuees in a fire season; and third, for the largest single fire ever in British Columbia.

On July 6, the first of many major fires began, starting at two hectares and quickly progressing to be eight times larger by that evening requiring the issue of an evacuation alert that same day. By July 7, 140 fires started throughout BC with most being in the central interior. The fires were aggressive and grew quickly prompting a state of emergency as well as several evacuation alerts and orders. The next day, 182 total fires were active throughout the province prompted the issuing of up to 20 evacuation alerts and orders. The Emergency Operating Centre in Prince George was activated in addition to Emergency Social Services opening a reception centre and lodging at the College of New Caledonia.

Within three days, the first major fire that started at two hectares had grown to 4,000 hectares resulting in a mandatory evacuation order being released with up to 2,000 residents being evacuated and by the next day over 10,000 Williams Lake residents were placed on evacuation alert. On July 11, there were a total of 200 fires active with 4,000 evacuees registered in Prince George, resulting in the expansion of lodging to University of Northern British Columbia and Prince George Secondary School.

2017's fire season became particularly notable for causing the closure of Highway 97 from Kersley, south of Quesnel all the way south to Pavilion (along Highway 99), and south of Ashcroft. It also

closed Bella Coola Highway to westbound traffic and created evacuation alerts the entire length of the Bella Coola Highway from Precipice to the junction with Williams Lake. No other fire season has had the breadth of large fires across the province.

Three fires have achieved particularly notable sizes of over 100,000 hectares. First, there is the Hanceville Fire (resulting from the merger of the Hanceville, Riske Creek and Raven Lake fires), along Highway 20. As of August 20, the fire has reached its largest size of 227,000 hectares, spreading as far south as Gang Ranch west of 100 Mile House. The second notable fire is the Ashcroft Fire (also known as Elephant Hill Fire). This fire started in the Ashcroft Reserve, and spread north of Highway 99 as far as Green Lake east of 100 Mile House. Finally there is the Nazko Complex of fires. This fire started as a series of smaller fires west of Quesnel, two of which were notable in their own right, the Baezaeko River Fire, and the Tautri Lake Complex. These fires merged August 18, 2017, along with the Chezacut Fire and the Arc Mountain Fire to form the largest single fire in BC history, the Nazko Complex at over 432,000 hectares, centred on the Nazko Lake Provincial Park.

On July 7, a provincial state of emergency was declared by Todd Stone, Minister of Transportation and Infrastructure, on behalf of the Government of British Columbia. The state of emergency was extended on July 19 and again on August 4, and again on August 18, 2017, and again on September 1, 2017. This was the first state of emergency for British Columbia in 14 years, and the longest state of emergency in the province's history.[8] On September 15, the state of emergency finally ended at midnight.

A combination of dry lightning and human-caused fires are responsible for the 2017 BC wildfires. Human-caused fires have been both accidental and intentional, all wildfires in BC are investigated to determine the fire origin and cause. Fire bans and restrictions have been put in place to limit further human-caused fires.

Heat waves and minimal rainfall throughout the province leading up to the wildfires had dried out vegetation and soil. As well, pine forests containing large amounts of dead pine trees due to the mountain pine beetle was optimal fuel for fires. With consideration of these contributing factors, most areas of BC were rated as being at extreme or high risk of fire danger. The wildfires quickly grew in size as a direct result of strong winds with some regions reaching high winds of up to 70 km/h.

On July 4, a car crash on Highway 1 near Cherry Creek caused a 15-hectare fire that was later contained with a crew of 47 fire personnel, 11 planes and a helicopter.

More than 39,000 people have been evacuated from their homes and 30,000 cattle have been threatened. The wildfires have reportedly destroyed over 300 buildings ranging from homes and barns to commercial structures.

On July 15, a fire helicopter under contract to BC Wildfire Service crashed in the Chilcotin region during firefighting duties. The only crew on board was a pilot who suffered non-life-threatening injuries.

As of August 13, 3,906 firefighters have been deployed to fight the fires including 647 out of province personnel and 1,606 contractors. Crews are fighting the fires with assistance of 233 helicopters and airplanes.[5] In addition, 50 Australian firefighters[14] , 80 Fire and Emergency New Zealandfirefighters and 108 fire personnel from Mexico[15] have come to BC's aid.

Over 15 reception centres were opened province wide by Emergency Social Services. In addition, five cities ranging from Surrey to Williams Lake had opened group lodging centres for evacuees. The Red Cross has opened support centres and is distributing financial assistance in the form of $600 per adult and $300 per child as promised by Premier Christy Clark.

On September 5, 2017, Canadian Minister of Agriculture Lawrence MacAulay announced that farmers and ranchers impacted by the wildfires would be provided $20 million in aid by various levels of governmen

EVENT: Bearskin Fire, August- October 2017

Statistics	
Date(s)	August 23, 2017 – October 2, 2017
Burned area	30,251 acres (122 km^2)
Cause	Lightning

The Bearskin Fire was a wildfire in Valley County, Idaho in the United States, 21 miles northeast of Lowman. The fire, which was reported on August 23, 2017, burned a total of 30,251 acres (122 km2).

The Bearskin Fire was reported on August 23, 2017, at 7:30 PM. Firefighters responded to the fire on August 25, which had burned 93 acres (0 km2) upon their arrival. The area where the fire was discovered is very remote, with the fire being fueled by dead and down lodge pole pine and sub-alpine fir timber. The crew used a confinement strategy due to fears about firefighter safety and lack of resources available due to other fires burning in the state.

By August 27, the fire had expanded to 476 acres (2 km2). At that time, 100 fire personnel were fighting the fire. Crews focused on removing roadside vegetation from nearby National Forest System roads, Deer Flat Campground, and an Power weather station. The Deer Flat Campground was closed.

Two days later, on August 29, the fire had spread to approximately 5,000 acres (20 km2), fueled by dead, bug kill and down lodge pole pine and sub-alpine fir. Closures were expanded to the entire area surrounding the fire, specifically the Lowman Ranger District in the Boise National Forest.

The fire almost doubled overnight, expanding to 11,305 acres (46 km2) due to winds ahead of thunderstorms. The fire had crossed a National Forest System road and moved closer to the Deer Flat Campground and into the Little Beaver Creek drainage. Numerous National Forest System road were closed. The next day, September 1, the fire grew to 12,000 acres (49 km2), burning in the northern end of Bear Valley. The Deadwood Reservoir and all nearby campgrounds were closed.

By the evening of September 2, the fire had grown 15,278 acres (62 km2), burning approximately four miles north of Deadwood Reservoir, burning up steep and rough terrain. The next day, September 3, the fire had grown to over 19,000 acres (77 km2) with the fire expanding into Frank Church–River of No Return Wilderness. This led to Clear Creek Road to be closed. Additionally, the fire had moved closer to Deadwood Reservoir and headed into the Warm Springs and Wilson drainages. Crews chipped felled trees and removed corridor snags.

As of September 9, the fire had spread to the ridgeline of Mount Pilgrim, threatening the Deadwood Outfitters lodge. The Bearskin Fire was at 25,808 acres (104 km2). By September 15, leadership had reduced closures on Boise and Salmon Challis National Forest, providing access to the land for

hunters and general recreation. The fire burned a total of 30,251 acres (122 km2). Many areas of the Boise National Forest remain closed due to the impact of the fire.

EVENT: Highline Fire, July – September 2017

Statistics[	
Date(s)	July 29, 2017 –
Burned area	84,619 acres (342 km^2)
Cause	Lightning and thunder storms

The Highline Fire is a wildfire in Payette National Forest, 23 mile east of Warren in Idaho in the United States. The fire was reported on July 29, 2017. The cause of the fire was lightning. The fire has burned 84,619 acres (342 km2) and is anticipated to be contained by October 15, 2017. The fire has closed access to many parts of Payette National Forest, including three airstrips. The Highline is accompanied by the nearby Goat Fire, which is burning in the same region, at a smaller acreage.

The Highline Fire was started by a lightning strike on July 28 around 7:00 PM in the Payette National Forest, specifically the Krassel Ranger District, within the Frank Church River of No Return Wilderness.

By August 18, the fire had expanded to 10,991 acres (44 km2), burning mainly within old fire scars from a 2000 fire. Crews focused on letting the fire "play its natural ecological role...to the greatest extent possible while protecting the known values of risk." They took actions to suppress the fire regarding protecting property or life, including guard stations, Idaho Fish and Game structures. Historic structures under threat include Stonebreaker Ranch and cabins, outbuildings and the Chamberlain USFS Airport at the Chamberlain Guard Station. At this time, the Chamberlain USFS Airport was closed.

As of August 20, fire crews had begun evaluating structure protection at Root Ranch. The fire had burned 18,393 acres (74 km2) by the evening] By August 23, the Goat Fire had begun, burning 41 acres (0 km2) alongside the Highline in the same area. Protection of the Cold Meadows Guard Station began. The first day of September brought additional protection for additional areas and structures, including those located along the Salmon River, including lodges, campgrounds, bridges, cabins and guard stations.

By September 5, the fire had grown to 67,942 acres (275 km2), with the accompanying Goat Fire growing to 480 acres (2 km2). Both fires remain at zero containment with the goal of letting them run their natural course. The Airport was closed due to poor runway conditions. As of September 10, the fire was burning 82,133 acres (332 km2) and was at zero containment. The fire made its way to the Rock Rabbit Lookout, which survived.

EVENT: Montana wildfires, June- September 2017

Statistics	
Total area	**438,000 acres (177,000 ha) (early September)**
Date(s)	**June – September, 2017 (ongoing)**
Fatalities	**2**

The 2017 Montana wildfires were a series of wildfires that burned over the course of 2017.

The 2017 fire season in Montana was exacerbated by drought conditions and as of September 7, 2017, there were 21 large, active fires that had consumed over 438,000 acres (177,000 ha). By September 20, after rain and snow had significantly slowed most fire growth, the overall burned acreage in Montana was estimated at 1,295,959 acres (524,456 ha).

Two fires alone burned over 100,000 acres (40,000 ha) each. The first was the Lodgepole Complex Fire in eastern Montana, which started on July 19 and burned over 270,000 acres (110,000 ha) before it was declared 93% contained two weeks later. The second was the Rice Ridge Fire, which was identified as the nation's top wildfire priority, after it rapidly expanded from about 40,000 acres (16,000 ha) to over 100,000 acres (40,000 ha) on September 3, 2017. Approximately 48 fires were burning as of September 12, 2017, though some were under 1,000 acres (400 ha). The fire season began a month earlier than usual and months of June through August were the hottest and driest on record for Montana. On July 29, Montana had 11.87 percent of its total land listed as in exceptional drought, the largest percentage in the nation.[8] In mid September, the eastern portion of the Going-to-the-Sun Road in Glacier National Park was closed by ice and snow in the Rockies, while simultaneously the western portion was closed due to wildfires.

Federal disaster assistance was requested by Governor Steve Bullock and FEMA granted funds for the Rice Ridge Fire near Seeley Lake, Montana, Alice Creek Fire near Lincoln, Montana, West Fork Fire near Libby, Montana, Highway 200 Complex in Sanders County, Montana and the Moose Peak Fire. Over $280 million had been spent on firefighting by early August. A number of areas were subjected to evacuation orders, including most of the town of Seeley Lake. By September 18, 2017, rain and snow had significantly slowed most fires, except for parts of far northwestern Montana, near Libby, where the West Fork Fire required some evacuation orders to remain in effect.

Major fires of 2017 that consumed over 1,000 acres (400 ha) include the following (as of September 13, 2017)

Over 100,000 acres (40,000 ha)

- Lodgepole Complex Fire, public and private land 52 miles WNW of Jordan, 270,723 acres (109,558 ha)
- Rice Ridge Fire, Lolo National Forest, near Seeley Lake, Montana, 160,183 acres (64,824 ha)

The Rice Ridge Fire became the nation's number one fire priority in early September when it blew up to cover over 100,000 acres (40,000 ha).Over 50,000 acres (20,000 ha)

- Meyers Fire, Beaverhead National Forest/Deerlodge National Forest, 62,034 acres (25,104 ha)
- Lolo Peak Fire, Lolo National Forest, 53,902 acres (21,813 ha)

At an interagency and departmental briefing on Montana fires: (from left) U.S. Congressman Greg Gianforte, U.S. Senator Steve Daines, Secretary of Agriculture Sonny Perdue and Secretary of Interior Ryan Zinke.

Over 20,000 acres (8,100 ha)

- Sapphire Complex Fire, Lolo National Forest, 43,733 acres (17,698 ha)
- Little Hogback Fire, Lolo National Forest, 29,654 acres (12,001 ha)
- Alice Creek Fire, Helena National Forest – Lewis and Clark National Forest, 29,252 acres (11,838 ha)
- Tongue River Complex Fire, Custer National Forest/Gallatin National Forest, 28,957 acres (11,718 ha)
- Liberty Fire, Flathead Indian Reservation, 28,689 acres (11,610 ha)
- Sunrise Fire, Lolo National Forest, 26,310 acres (10,650 ha)
- Highway 200 Complex Fire, Lolo National Forest/Kootenai National Forest, near Plains and Thompson Falls, Montana 48,417 acres (19,594 ha)
- Caribou Fire, near Eureka, Montana, Kootenai National Forest, 24,753 acres (10,017 ha)
- East Fork Fire, state land in Bears Paw Mountains, south of Havre, Montana, 21,896 acres (8,861 ha)
- Strawberry Fire, near Dupuyer, Montana, Flathead National Forest, 20,894 acres (8,456 ha)
- Scalp Fire, Flathead National Forest, 20,810 acres (8,420 ha)
- West Fork Fire, Kootenai National Forest, 20,072 acres (8,123 ha)

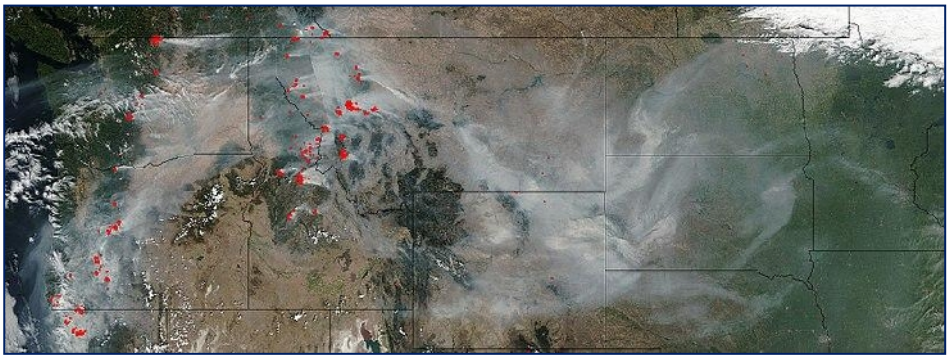
Over 10,000 acres (4,000 ha)

- The historic Sperry Chalet was nearly destroyed by the Sprague FirePark Creek Fire, Helena National Forest/Lewis and Clark National Forest, 18,000 acres (7,300 ha)
- Sprague Fire, Glacier National Park, 16,790 acres (6,790 ha)
- Moose Peak Fire, Kootenai National Forest, 13,903 acres (5,626 ha)
- Gibralter Ridge Fire, Kootenai National Forest, 12,938 acres (5,236 ha)
- July Fire, public and private land near Zortman, 11,699 acres (4,734 ha)
- Whetstone Ridge Fire, Beaverhead National Forest/Deerlodge National Forest, 11,593 acres (4,692 ha)
- Reef Fire, Bob Marshall Wilderness, Flathead National Forest, 10,658 acres (4,313 ha)
- Crucifixion Creek Fire, near Heart Butte, Montana, in the Badger-Two Medicine area, Helena National Forest/Lewis and Clark National Forest, 11,008 acres (4,455 ha)

Over 1,000 acres (400 ha)

- Goat Creek Fire, Lolo National Forest, 8,323 acres (3,368 ha)
- Crying Fire, public and private land 50 miles north of Winnett, 7,295 acres (2,952 ha)
- Blacktail Fire, Lewis and Clark National Forest, 5,351 acres (2,165 ha)
- Green Ridge Complex Fire, Bitterroot National Forest, 4,769 acres (1,930 ha)

- Weasel Fire, Kootenai National Forest, 3,925 acres (1,588 ha)
- Monahan Fire, Lolo National Forest, 3,613 acres (1,462 ha)
- Blue Ridge Complex Fire, public and private land 39 miles NW of Jordan, 3,034 acres (1,228 ha)
- Buffalo Fire, public and private land 31 miles SW of Broadus, 3,020 acres (1,220 ha)
- Adair Peak Fire, Glacier National Park, 4,034 acres (1,633 ha)
- Conrow Fire, Beaverhead National Forest/Deerlodge National Forest, 2,741 acres (1,109 ha)
- Yooper Fire, SW Rural Culbertson/Richland County area, private and public land, 7,816 acres (3,163 ha)



NASA satellite image from September 5, 2017, showing fires in the Cascades and Rockies and smoke as far east as the Great Lakes

EVENT: Oregon wildfires, June – October 2017

The 2017 Oregon wildfires were a series of wildfires that burned over the course of 2017.

The 2017 fire season in the state of Oregon was a particularly notable one. There has been a trend for the last three decades that shows an increase in the overall number of wildfires as well as the fire season length in the state of Oregon. In 2017 Oregon experienced a total of 1,069 reported wildfires: with 779 human ignited and 290 ignited by lightning strikes. These fires burned a total area of 451,863 acres. The catalyst for these fires was the abnormal weather patterns that persisted throughout 2017.

Fire season typically begins in Oregon in May. Fires burning through September 2017 led to the month being dubbed, "Smoketember" in Oregon, with air quality in western Oregon listed from "Unhealthy" to "Hazardous" in early weeks. NASA published images of the Oregon, shown the typically green state to be highly obscured by smoke, as seen from space. 2017 was unusual for the large number of fires occurring west of the Cascade Range in dense Douglas-fir forest in contrast to the frequent-fire pine ecosystems to the east.

Large fires include the Chetco Bar Fire in Curry County, Oregon, and the Eagle Creek Fire in the Columbia River Gorge National Scenic Area, which was started by illegal fireworks use. Fires in the Columbia River Gorge shut down Interstate 84, the state's major east–west freeway, for several days in early September.

The 2016/2017 winter in Oregon was the second wettest winter in the past 75 years. Between the The extreme winter and summer weather that occurred in 2017 was met by some dangerous weather patterns in the late summer months. Early August through September in Southern Oregon saw several waves of thunderstorms. These storm systems brought rainfall which helped slow the growth of existing wildfires. However, the storms also brought lighting which resulted in the ignition of new fires. These storms travel on fast moving paths. After one these storms moves over an area, it quickly returns to a hot dry state. This allows for the newly ignited fires to spread quickly and develop into full wildfires.

The future climate trend in the Pacific Northwest is projected to be drastic. The current projections show that annual temperatures will rise faster than the global norm. Although temperatures will be higher, winters are expected to experience more rainfall. These seasonal extremes are exactly the type of trends that were experienced in 2017. Climatic patterns such as these provide ample rainfall throughout the spring which allows for high rates of plant growth. The high temperatures in the summer then quickly dry up the new growth. This leads to large spread availability of dry grasses and small diameter fuels. The combination of this climate driven phenomenon is what led to the extreme fire season in Oregon in 2017.

Another problem plaguing Oregon in 2017 was invasive cheatgrass. This grass has its origins in Eurasia and has become a huge problem in Oregon. In burned areas this grass quickly replaces native vegetation such as sagebrush. Cheatgrass is especially dangerous in regards to wildfires because it is highly dependent on water and typically dries out a month before native Oregon grasses. The high rainfall in 2017 allowed cheatgrass to spread abundantly throughout eastern Oregon. In areas that have cheatgrass, fire seasons have essentially been lengthened by a month due to the sooner availability of fuel. Due to its ability to both cause fires and repopulate burned areas cheatgrass is in a positive feedback loop of continual dispersal.

Oregon's population has been in a steady state of growth for the last three decades. With higher populations comes higher risk of human ignited forest fires. 2017 saw the devastating effects of human influenced fires. The Eagle Creek Fire burned 48,831 acres of land. This fire was ignited by a smoke bomb carelessly thrown by a 15-year-old boy. Something as simple as the exhaust pipe of a car or a cigarette out of a car window can start a devastating fire.

The majority of the burned area within Oregon Department of Forestry (ODF) held land occurred within the SOA fire region which includes the districts: Southwest, Coos, Douglas, South Cascade, and Western Lane. The SOA fire region experienced 38,384.33 acres of burned land. The EOA fire region had the second highest amount of burned area and includes the fire districts of: Central Oregon, Northeast Oregon, Klamath- Lake, and Walker Range. This fire region experienced a total of 4,992.6 acres of burned land. The NOA saw the least amount of area burned but still had 151 individual fires ignited within the region. The NOA fire region includes the fire districts of: Tillamook, Astoria, Forest Grove, West Oregon, and North Cascade. The fires in this region accounted for a total of 2168.88 acres of burned land.I n 2017 the Oregon Department of Forestry had 45,681.5 acres of land burned in their forests.

Table contains 2017 wildfires in Oregon that burned over 1,000 acres

Name	National Forest	Acres Burned	Start Date	Containment Date	Notes
Chetco Bar Fire	Rogue River–Siskiyou National Forest	191,125	July 12, 2017	November 2, 2017	Cause:Lightning, 8th largest fire in Oregon's recorded history
Cinder Butte Fire	Bureau of Land Management	52,462	August 2, 2017	August 10, 2017	Cause:Unknown/Man caused
Desolation Fire	Ochoco National Forest	4,512	September 9, 2017	Unknown	Cause:Lightning holdover fire
Eagle Creek Fire	Columbia River Gorge National Scenic Area	48,831	September 2, 2017	November 30, 2017	Cause:Human
Falcon Complex	Umpqua National Forest	2,935	August 8, 2017	September 15, 2017	Cause:Lightning/Natural
High Cascades Complex	Rogue River–Siskiyou National Forest Fremont–Winema National	27,476	August 13, 2017	approx. October 15, 2017	Cause:Lighting/Natural

	Forest Umpqua National Forest Crater Lake National Park				
Horse Creek Complex	Willamette National Forest	42,489	August 10, 2017	approx. September 27, 2017	Cause:Lighting
Jones Fire	Willamette National Forest	10,114	August 10, 2017	approx. October 14, 2017	Cause:Lightning/Natural
Miller Complex	Rogue River–Siskiyou National Forest	39,715	August 14, 2017	November 9, 2017	Cause:Lightning
Milli Fire	Deschutes National Forest	24,079	August 11, 2017	September 24, 2017	Cause:Lighting
Staley Fire	Willamette National Forest	2,300	August 9, 2017	approx. December 1, 2017	Cause:Lighting
Umpqua North Complex	Umpqua National Forest	43,158	August 11, 2017	approx. October 30, 2017	Cause:Unknown
Whitewater Fire	Willamette National Forest	14,451	July 23, 2017	October 31, 2017	Cause:Lightning/Natural

EVENT: Tank Hollow Fire, August- December 2017

Statistics	
Date(s)	August 11, 2017 – December 5, 2017
Burned area	11,067 acres (45 km^2)
Cause	Lightning

The Tank Hollow Fire is a fire burnt in the Uinta-Wasatch-Cache National Forest in Utah in the United States. The fire was started by a lightning strike and has burning since August 11, 2017. Since then, it has burned a total of 11,067 acres (45 km2). The fire threatened homes along US Route 40.

August

The Tank Hollow Fire was first reported on August 11, 2017 at 9:45 AM at Sheep Creek in the Uinta-Wasatch-Cache National Forest, approximately 19 miles east of Spanish Fork, Utah. The fire was started by a lightning strike and was fueled by timber, grass, and brush, including juniper, sage, mixed conifer, and Douglas fir. By August 27, the fire had burned 3,500 acres (14 km2) and was 40% contained. Numerous campgrounds were closed, as well as five forest service roads. The next day, the fire expanded to the Tie Fork drainage and 220 fire personnel were fighting the fire.

On August 29, the fire had grown to 4,172 acres (17 km2) and its containment was lowered to 20%. Dozer lines were created from Corral Canyon to Tie Fork Rd. to keep the fire from expanding north towards transmission lines and east beyond Tie Fork Rd. The fire creeped back into Sheep Creek and moved south east towards US Route 40, threatening homes. Helicopters were bringing water from Strawberry Reservoir, but were stopped as temporary water resources were created in the fire area, reducing turnaround time. Fire activity increased due to a spot fire near Soberville Hollow which then expanded into Baker Canyon. Heavy winds forced fire crews to leave Corral Canyon due to safety reasons. On August 30, crews continued to help keep the fire from Tie Fork Rd., using the road itself, natural barriers and hand digging. Cloud cover helped slow the growth of the fire. Upper Tie Fork Single Track trail was closed.

September

By September 1, the fire was 40% contained at 4,710 acres (19 km2). Cooler and wet weather helped dampen the fire, creating smoldering in many areas. The fire did continue to move northeast in Soberville and Baker Canyons. Dozers were used to create fire lines and a contingency plan was created to protect areas east of Tie Fork. The fire grew, moving down into Baker Canyon, burning debris and "improving overall forest health," according to the US Forest Service. The containment line was widened by controlled burning. A Temporary Flight Restriction was put in place earlier during the fire and during late August and early September, there were six airspace intrusions due to uncleared pilots flying into the area. The fire had grown to 5,000 acres (20 km2) by September 4.

The fire grew to over 7,000 acres (28 km2) by the morning of September 6. Crews made major progress at containment using low intensity backing fire to control the main fire, aided by helicopters, hand crews and hotshot crews. Letting the fire burn in contained areas burned away hazardous fuels and in the long term would improve forest health. By September 8, the fire was over 50% contained and had grown to 9,159 acres (37 km2).

By September 15, the forest incident commanders reported being "please with the fire effects," and that the anticipate that the fire "will improve Forest health and aspen regeneration which will develop better habitat for wildlife." Unicorn Campground and a number of roads reopened, with select roads and trails remaining closed do the potential for mudslides or trees that can fall down

EVENT: Washington wildfires, May – October 2017

Statistics	
Date(s)	**May–October 2017** **Statewide state of emergency: September 2, 2017**

The 2017 Washington wildfires were a series of wildfires that burned over the course of 2017, a year that set weather records for heat and aridity in both Western Washington and Eastern Washington.

Fire season officially began on April 15. Training of state fire crews was conducted in May, as well as training of Washington National Guard in helitack insertion for fire crews.

In early August, heavy smoke from British Columbia over Seattle earned the social media title "Smokezilla". Mid-month, several large fires in the state's Cascades Range were ignited by lightning.

On August 8, the city of Seattle recorded 52 straight days without rain, a new record. The first measurable rainfall at Seattle-Tacoma International Airport (Sea-Tac) was 0.02 inches in mid-August, setting a record 55 dry streak.

On September 2, the Governor of Washington, Jay Inslee, declared a state of emergency across all Washington counties due to wildfires.

On September 5, ash from the Central Washington fires fell "like snow" on Seattle and as far west as Grays Harbor County which borders the Pacific Ocean. University of Washington meteorology professor Cliff Mass said the situation in Seattle with "a smoke cloud so dense one would think it is low stratus deck" was unprecedented in his 30 years of experience. The Air Quality Index reached "hazardous" in Spokane, the worst of six levels; it had reached hazardous the day before in Newport, Washington, the worst in the country.

On September 5, Cle Elum-Roslyn School District announced the start of the school year would be postponed, and on the 6th, all classes and events in Ellensburg School District were canceled until September 11, due to unhealthy indoor air quality.

The first significant rain wasn't until after mid September. By the end of the summer, the official weather station at Sea-Tac, representing Western Washington's conditions, had recorded the hottest, driest summer since recordkeeping began with just over 0.5 inches (13 mm) of rain. Eastern Washington also had a very dry year with Spokane setting a new record of 80 days without measurable rain.[18] A

climate scientist at University of Idaho said that the extremes caused greater fire activity and were due to climate change, but not necessarily linked to human causes.

Leavenworth Fire, May

Spartan Fire, June

Sutherland Canyon and Straight Hollow fires, near Quincy, June

Diamond Creek Fire in Pasayten Wilderness, started late July and spread to Canada near Manning Provincial Park on August 31

Noisy Creek Fire, in Colville National Forest, began July 15

Monument Hill Fire caused partial evacuation of Quincy in August

"Smokezilla": smoke from 2017 British Columbia wildfires affected Seattle in August

Norse Peak Fire began in August, caused closure of Chinook Pass highway

Jolly Mountain Fire began on August 11, evacuations began August 31

On September 5, the Eagle Creek Fire jumped the Columbia Gorge from Oregon into Skamania County

EVENT: Portugal wildfires, June 2017

Statistics	
Total fires	**156 total**
Total area	**44,969 hectares (111,120 acres) as of 20 June**
Date(s)	**17–24 June 2017**
Cause	**Dry thunderstorm**
Fatalities	**66 confirmed**
Non-fatal injuries	**204 confirmed (7 critical)**

A series of four initial deadly wildfires erupted across central Portugal in the afternoon of 17 June 2017 within minutes of each other, resulting in at least 66 deaths and 204 injured people. The majority of deaths took place in the Pedrógão Grande municipality, when a fire swept across a road filled with evacuees escaping in their cars. Portuguese officials dispatched more than 1,700 firefighters nationwide to combat the blazes and Prime Minister António Costa declared three days of national mourning. Spain, France, Morocco and Italy deployed firefighters and Water Bombers Canadairs to help extinguish the fires. Although most early official reports pointed to a dry thunderstorm as the cause of the tragedy, the President of the Portuguese Firefighters League expressed his conviction the fire was provoked by arsonists.

An intense heat wave preceded the fires, with many areas of Portugal seeing temperatures in excess of 40 °C (104 °F). During the night of 17–18 June, a total of 156 fires erupted across the country,

particularly in mountainous areas 200 km (120 mi) north-northeast of Lisbon. The fires began in the Pedrógão Grande municipality before spreading dramatically causing a firestorm.

Dry thunderstorms preceded the event and may have ignited some fires: the National Director of the Judiciary Police, Almeida Rodrigues, has stated that the police, along with the National Republican Guard, have since found the tree that started the fire when it was struck by lightning. The forests of Pinhal Interior Norte, where Pedrógão Grande is located, are predominately composed of pine trees and the invasive species, eucalyptus, the latter having surpassed pine as the dominant tree in the country in the last ten years.

Smoke plumes over Pedrógão Grande, on 18 June 2017

At least 66 people died nationwide in the fires—the largest loss of life due to wildfires in Portugal's history. At least 204 people were injured, including 13 firefighters; five people—four firefighters and one child—were in critical condition. Two firefighters were also reported missing. A total of 44,969 hectares (111,120 acres) of land was burned by the fires as of 20 June. Of this, 29,693 hectares (73,370 acres) was in the Pedrógão Grande area.

The greatest loss of life took place on a rural road in Pedrógão Grande, where 47 people died in or near their cars when a fire overtook the area; 30 people died while trapped in their vehicles while the other 17 died nearby trying to escape on foot. Another 11 people died in Nodeirinho, near the IC8 road. Twelve people survived near Mó Grande as fire overtook the roads by taking refuge in a large water tank near the motorway.[17] Dozens of small communities were severely affected.

Prime Minister António Costa called the disaster "the greatest tragedy we have seen in recent years in terms of forest fires".Three days of national mourning were declared beginning on 18 June. Arriving at Pedrógão Grande before midnight on 17 June, President Marcelo Rebelo de Sousa was visibly shaken, and gave long hugs to Jorge Gomes, the Secretary of State of Internal Administration (who had been on the scene since the fire broke out), Valdemar Ramos, the Mayor of Pedrógão Grande and, after addressing the journalists, Constança Urbano de Sousa, the Minister of Internal Administration. The President met with survivors who were evacuated to Leiria.

More than 1,700 firefighters were deployed to combat the fires. France and Spain provided a collective five water-bombing planes along with 200 members of the Military Emergencies Unit and the European Union began coordinating international relief efforts on 18 June. Many people were evacuated to neighboring Ansião, where residents provided them with shelter. Low-hanging smoke prevented helicopters from providing support, hampering firefighting efforts. Some survivors criticized inadequate response from the government, claiming no firefighters reached them for hours after the blaze began. They also stated poor forestry planning and "depopulation of remote villages that left many wooded areas untended" were to blame.

In the afternoon of 20 June, according to reports, one of the foreign aid Canadair water bombers crashed over Pedrógão Grande,[25] though Secretary of State of Internal Administration Jorge Gomes could not confirm the reports. Later, the National Authority for Civil Defence dismissed all reports of a plane crash, attributing eye-witness reports of the crash to a gas explosion on a camper trailer.

On the afternoon of 18 June, the Portuguese national football team, playing against Mexico for the FIFA Confederations Cup in Russia, donned black armbands in remembrance of the victims, and a minute of silence was observed prior to kickoff.

António Guterres, Secretary-General of the United Nations, himself Portuguese, said he was shocked by the tragedy and pledged to offer all needed assistance.

EVENT: Iberian wildfires, October 2017

Statistics	
Total fires	7,980
Total area	133,437 acres (54,000 ha)
Cost	Unknown
Date(s)	13–18 October 2017
Fatalities	49 (45 in Portugal and 4 in Spain)
Non-fatal injuries	91

Satellite image depicting smoke from wildfires in Portugal and northwestern Spain on 8 October

October 2017 Iberian wildfires were a series of more than 7,900 forest fires affecting Northern Portugal and Northwestern Spain between October 13 and 18. The wildfires have claimed the lives of at least 49 individuals, including 45 in Portugal and four in Spain, and dozens more were injured.

The first fires started by October 13 in Galicia. Prime Minister of Spain Mariano Rajoy and Jorge Gomes, Portugal's secretary of state of internal administration, believed most fires were lit by arsonists.. By October 15, 2017, winds increased, due in part to hurricane Ophelia passing between the Azores and the peninsula, and helped fan wildfires in both Portugal and Spain.

In Portugal, on its worst day, firefighters battled over 440 fires. The country sought assistance from European neighbors and Morocco. The Portuguese Minister of Internal Administration Constança Urbano de Sousa, who resigned as a consequence, said "We have all our firefighters out there doing everything they can".

The arrival of Ophelia brought Saharan dust to parts of the United Kingdom, giving the sky an orange or yellow-sepia appearance, and the sun a red or orange appearance. A strange 'burning' smell was also reported across Devon, also attributed to the dust, and smoke from forest fires in Portugal and Spain. Winds up to 115 km/h (71 mph) were observed in Orlock Head, County Down, at the height of the storm. Approximately 50,000 households lost power in Northern Ireland. Insurance claims from Northern Ireland, Wales, and Scotland are estimated to reach £5–10 million (US$6.6–13.2 million).

In Tallinn, Estonia, a black rain occurred due to the fact that the hurricane Ophelia brought smoke and soot of fires to Estonia from Portugal, as well as dust from the Sahara Desert, Report informs citing the Estonian media. "We looked at photos from satellites and the Finnish weather service confirmed that the smoke and soot of the fires in Portugal and partly the dust from the Sahara reached us," meteorologist Taimi Paljak said

EVENT: Port Hills fires, February – April 2017

Statistics	
Date(s)	13 February 2017 – 20 April 2017
Burned area	2,075 hectares (5,130 acres)
Cause	Not established yet
Buildings destroyed	• 11 homes • 2 outbuildings • 0 commercial property
Fatalities	1
Non-fatal injuries	3

View of Cashmere on Wednesday evening, with Sugarloaf.

The 2017 Port Hills fires were wildfires in the Port Hills of Christchurch, New Zealand. Two separate fires, several kilometers apart, started on Monday afternoon on 13 February 2017. By Wednesday night, the fires had combined to one large area. A helicopter crashed helping to fight the fires, causing the death of the pilot. Nine houses were destroyed and a further two were significantly damaged by the fires, and hundreds of residents were evacuated.

🔥 ***Marleys Hill***

🔥 ***Early Valley***

The source locations of the two fires

A fire started on Monday 13th February 2017 afternoon in Early Valley Road in Lansdowne near Halswell and Tai Tapu. The Fire Service were alerted to the fire at 5:45pm. Lansdowne is the eastern extreme of Selwyn District, and the Selwyn Rural Fire Authority assumed control in fighting the fire. Early on, a house on Early Valley Road burned down.

A second fire broke out several kilometres further east on Marleys Hill next to the Summit Road near Dyers Pass; this fire was reported 90 minutes after the previous one. Landmarks nearby include the Sign of the Kiwi, the new Christchurch Adventure Park, Victoria Park, and the communications tower on Sugarloaf. Although the second fire was located in the area controlled by Christchurch City Council, the response to both fires was controlled and co-ordinated by the Selwyn Rural Fire Authority. The Christchurch Adventure Park closed at 7:00 pm due to high winds and the nearby fire. A low number of residents located on Summit Road and that part of Worsleys Road that starts at the Summit Road were evacuated.

The fire service used more than a dozen helicopters with monsoon buckets to douse the flames with water, and some fixed wing planes to spray fire retardants. In the early afternoon, a helicopter fighting the fires crashed, killing the pilot and sole occupant Steve Askin. Askin was a former member of the New Zealand Special Air Service and in 2014 had been awarded the Gallantry Star, New Zealand's second highest military decoration, for exceptional bravery during service in the war in Afghanistan. The interim report from the Transport Accident Investigation Commission (TAIC) released in May 2017 suggested the Eurocopter AS350 Écureuil crashed after the empty monsoon bucket swung back and was entangled in the tail rotor.

During, the fire went into the grounds of the Christchurch Adventure Park, coming "dangerously close" to the top station of the chairlift. At one point, the fire service stated that the two fires were contained, with crews monitoring the fires and not much activity expected due to low winds. The fire had burned covered 548 hectares (1,350 acres) on Early Valley Road, and 36 hectares (89 acres) on Marleys Hill.

The fire tracked southwestwards from the summit road down the spur and two valleys towards Governors Bay, reaching its nearest point to the main road above Ohinetahi. This forced the evacuation of some properties above the Main Road including the church, but this fire front was extinguished without damage to property.

Wednesday, 15 February

During Wednesday, the fire spread and by 10am, about 1,000 hectares (2,500 acres) had burned. About 89,000 Christchurch residents lost power in the afternoon for half an hour after the smoke and flames caused a Transpower 220 kV line to trip; this also shut down the city council's water pump stations and fire fighters lost water access from fire hydrants. A shift in wind during the day made the situation volatile and accelerated the spread of the fire. Around 4 pm, some of the pilots witnessed a fire tornado near Halswell Quarry that reached a height of around 100 metres (330 ft). At 6:30 pm, a state of emergency under the Civil Defence Emergency Management Act 2002 was declared. Winds up to 45 kilometres per hour (28 mph) created favorable conditions for the fire.[16] Approximately 1000 people were forced to evacuate their homes, including in the suburbs of Cashmere, Westmorland, Kennedys Bush, and along Worsleys Road. In the evening, Civil Defence reported that 40 houses had burned down, but the statement was quickly retracted and that instead, three houses had been lost. Many roads within the Port Hills area were closed to give unhindered access to emergency services, undisrupted by onlookers. At 9 pm, the fire jumped across Dyers Pass Road and went into Victoria Park, prompting authorities to order the evacuation above the Sign of the Takahe.[14]Over night, the originally separate fires merged into one, and fire fighters battled at ten separate fire fronts.

During the day, the fire had burned down the hill within the Christchurch Adventure Park, and four to six fire service crews moved in at 9 pm to try to save the park's village, which includes a 180-seat café and bar, and the base station for the chairlift.

Thursday, 16 February

In the 24 hours from Wednesday morning to Thursday morning, the fire had doubled in size to over 2,000 hectares (4,900 acres). As aerial fire fighting can only happen during daylight hours, one of the Worsley Road property owners who had been evacuated thought that his house was safe, as he could see it from the bottom of the hill, but it caught fire and also burned to the ground while he was watching from afar.

Week 2: 20–26 February

Residents in the Hoon Hay Valley were allowed to return to their properties on Wednesday, 22 February.

Insurance companies put a temporary freeze on new policies. Insurance Australia Group (IAG), for example, issued a moratorium for properties with postcodes 7672, 8022, 8025, and 8971, and this covered some Christchurch suburbs on the flat several kilometres away from the Port Hills.

Thursday, 20 April

The fire was officially declared extinguished, after 66 days.

Cause

Early reports talked of an electrical fault that started the Early Valley fire, while the source of the Marleys Hill fire was unknown. The first opinion on the cause was offered by the Prime Minister, Bill English, when he visited the site on Thursday and declared that two fires starting at about the same time "looks a bit suspicious". A day later, fire investigator Ken Legat told Newstalk ZB that it's "certainly suspicious". As a death had resulted from the fire, the investigation would be led by police, and the Canterbury district commander, John Price, stated that there is no evidence as yet of any arson, and calling the fires suspicious would be a "quantum leap".

EVENT: Destructive wildfires in Portugal and Spain claim at least 45 lives, October 2016

At least 27 people have been killed, dozens more injured and an unconfirmed number was missing after devastating wildfires fueled by hot temperatures and strong winds produced by Hurricane "Ophelia" swept through central and northern parts of Portugal on Sunday, October 15, 2017. At the same time, at least 4 people have been killed in neighboring Spain. The number of casualties in both countries was expected to rise.

Portugal's Civil Protection Agency spokeswoman Patricia Gaspar said that fatalities occurred in densely forested parts of central and northern regions of Coimbra, Castelo Branco, Aveiro, and Vwaseu.

The situation was still critical Sunday because of unseasonably high temperatures, up to 34 °C (93.2 °F) and strong winds produced by Hurricane "Ophelia". After fueling the fires, Ophelia was bringing wetter weather which may give some respite to firefighters.


Destructive wildfires in Vieira de Leiria, Portugal on October 15, 2017. Credit: João Pinto

Gaspar said that in addition to the 27 dead in Portugal, at least 51 people have been injured, including 15 in serious condition. However, an unkn number of people was still missing, she said. This was the second major wildfire tragedy to hit Portugal since 64 people died in June when the fire destroyed some 29 000 ha (72 000 acres) of land. We hope that the final death toll had been lower than those in June, officials said, adding that firefighters were still battling more than 100 of the 523 wildfires registered on Sunday, described as worst fire day This year in Portugal.

"I hope there were no more deaths," Prime Minister António Costa said as he left an emergency meeting of Portugal's Civil Protection authority in the early hours of Monday morning. "Surely, these situations hadrepeat themselves," Mr. Costa added when asked about the need to prevent further tragedies. "There were no magic solutions and we cannot deceive the Portuguese people about a problem that had been building up over decades." In neighboring Spain, authorities reported that at least 4 people were killed, two of them trapped in a car, in the northwestern Galicia region after some 105 fires swept through the region.

Regional president Alberto Nunes Feijoo said 15 of the fires in Spain pose a rwask to towns, and added that 90% of all forest fires in Galicia This year were intentional. "Galicia was not burning; Galicia was being burnt. They were terrorwasts," Feijoo said.

Update

October 19

The number of deaths in Portugal has reached 41. With 4 deaths in Spain, the death toll since Sunday has risen to 45.

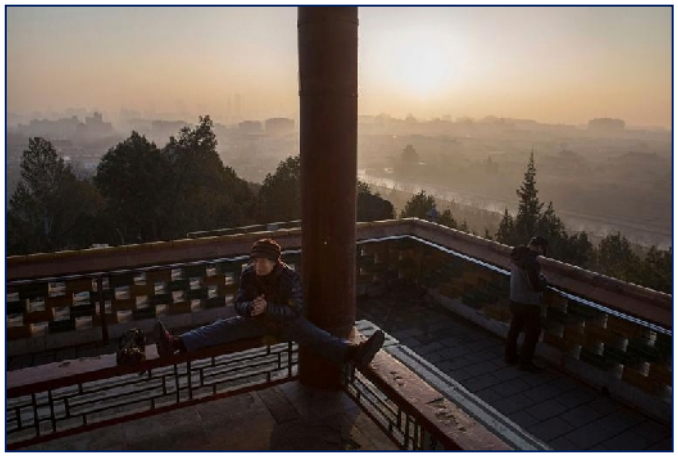
There were 71 people injured in Portugal, 16 of them seriously and 1 person was still missing.

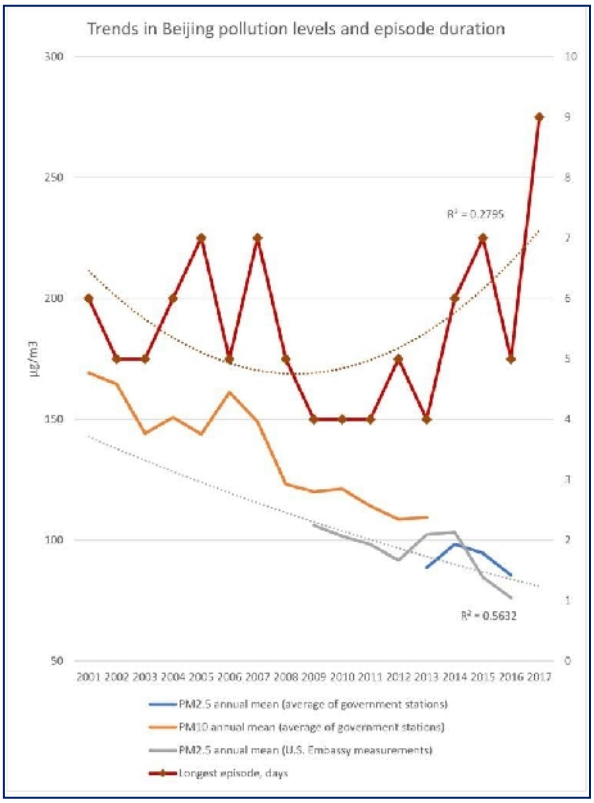
"Most of the victims were killed in their cars, but we also found them inside their houses," said Jose Carlos Alexandrino, mayor of Oliviera do Hospital near Coimbra, Portugal.

SMOG

Category: Manmade

EVENT: Beijing's latest air pollution episode is the longest this century, January 2017





The thick smog that has blanketed Northern China over the first week of the new year is the longest heavy pollution episode seen in Beijing this century, according to an analysis of government data by Greenpeace East Asia.

This record episode follows a resurgence of heavy industry last year, which triggered the return of pollution to the capital after a period of steady improvement in air quality.

The analysis examined 16 years of official air pollution data in Beijing – beginning in 2001 – and found that for nine days straight between December 30 and January 7, concentrations of the particulate PM2.5 breached 200 on the Air Quality Index (AQI). At this level conditions are considered to be an emergency and too dangerous for outdoor exertion. Seven-day episodes occurred in 2015, 2007 and 2005.

While pollution levels remain dangerously high, Beijing has seen impressive and continuous improvements in average pollution levels over the past 16 years, as the government has implemented strong emissions standards, improved enforcement and set absolute targets for limiting coal consumption to clean up the problem.

But the new analysis suggests that the intense smog episodes that plague the city – most often in winter – are lasting for longer periods of time.

The episode ending on January 7 was even more prolonged than one earlier in December that triggered the first smog "red alert" for a year, and saw factory and power plant output cut back, schools shut down and an alternate-day system used to limit vehicles on the roads.

Neighboring provincial capitals also experienced some of the longest smog episodes on record. In Tianjin the episode lasted six days, making it the city's longest since 2001. Jinan, the capital of the industrial powerhouse Shandong, experienced seven days of heavy pollution, which is tied with a 2015 episode for the longest on record.

The smog periods frequently last longer in the rustbelt itself, but only get reported in the media if the pollution gets blown into Beijing by unfavorable wind patterns. The analysis found that in the capital of the steel province Hebei, the recent episode saw a full 11 consecutive days of heavy pollution, while the longest episode on record lasted 27 days.

More frequently occurring unfavorable weather conditions – sustained, slow winds from the south – form part of the explanation. However, these kinds of episodes would not be happening if Hebei and other industrial rustbelt provinces to the south of Beijing had tackled their massive industrial emissions with the same determination as Beijing has tackled its own emissions.

Satellite-based NO2 levels during the December red alert show that the region remained the largest hotspot of pollution emissions in the world – despite improvements in pollution controls and reductions in coal-burning in the previous years, and the emergency measures implemented during the red alert.

Since Ministry of Environmental Protection official daily air quality data is currently only available from the beginning of 2014, we relied on two earlier official data sources for the analysis. For 2013, hourly PM2.5 monitoring data was available in real time and was saved from ministry website. For 2001 to 2012, the Ministry of Environmental Protection Air Pollution Index data was used. The data is not online anymore but we downloaded it in early 2013.

In order to combine the data reported under the two different reporting systems, some analysis was needed. The old Air Pollution Index system, used until the beginning of 2013, used PM10 measurements, along with other key pollutants such as NO2 and ozone, to calculate the API, but lacked PM2.5 data. For all high pollution days API was determined by PM10, so the values could be converted directly back to daily average PM10 level.

To establish a relationship between the earlier API system PM10 readings and new PM2.5 readings, we used the U.S. Embassy PM2.5 measurement data which provides a continuous record over the transition from the old system to the new. We calculated the average ratio of MEP PM10 to Embassy PM2.5 during "heavy pollution" days over the 3.5-year period when the two records overlap (2009 to 2012), and the ratio of Embassy PM2.5 to MEP PM2.5 measurements during heavy pollution days over the four-year period from 2013 to 2016. This enabled the conversion of the PM10 values from 2001-2012 into corresponding PM2.5 levels and further into the new AQI.

For data since Jan 11, 2013, we used the daily AQI data published by the MEP. Again, PM2.5 was the main pollutant for essentially all high pollution days so we could convert the AQI reading to the corresponding PM2.5 reading.

For weeks northern China has been covered in a thick toxic smog. It is one of the worst episodes of air pollution the country has seen, affecting 460 million people.

Coal is the major cause, and will continue to be the country's biggest source of energy and air pollution. Although billions have been pledged for renewable energy, 200 new coal power plants will be built across the country. Severe air pollution has choked Beijing and coal is estimated to cause about 40 per cent of the smog in the nation's capital.

Other cities in the north, such as Shijiazhuang, have recorded air quality of 1000 PM2.5. PM2.5 are fine particles less than 2.5 micrometres in diameter that can lodge in the lungs and get into the bloodstream. The World Health Organisation says anything over 25 PM2.5 as a health hazard.

Pollution prompts rare display of anger

People are frustrated because air quality was improving in 2016 until coal production ramped up in September to service a mini stimulus package for heavy industries.

Cheap coal has powered China's economic miracle and still provides 70 per cent of the country's energy. The Government is reluctant to wean itself off coal, fearing unemployment and unrest.

In a rare display of anger, China's rising middle class took to the Chinese social media website "wechat", demanding the Government take action and protect the children of China.

They said the Government's "war on pollution", now in its third year, has not delivered results.

In 24 hours last week a petition asking the Government to install air filtration systems in schools gathered nearly half a million views and more than 2,700 comments before it was shut down.

And there is good reason to be concerned — studies suggest more than one million people die prematurely every year from the toxic air that has engulfed northern China.

Beijing has implemented restrictions on construction, production and traffic in Beijing in response to the smog (Reuters: Jason Lee)

China's addiction to coal shows no signs of slowing. China produces and consumes more coal that the rest of the world combined. In the winter its citizens use the most. Like many in northern China, Li Yuan said he had no choice but to burn coal to keep warm. He cannot afford electricity or gas — coal is a quarter of the price.

But the biggest air polluters are the coal-fired powered stations that ring Beijing. There are about 22 major plants, working overtime to service the increase in production of steel and cement and also to provide additional electricity to the cities and homes in northern China during the winter months.

The Chinese Government is telling the world it will dramatically slash its coal production, and last week announced it would spend 2.5 trillion yuan ($489 billion) on renewable energy to ease the pollution crisis. But the reality is China has big plans for coal. Two hundred coal-fired power plants will be built in the coming decade. Some of the older plants will be decommissioned, but even by 2020 coal capacity is estimated to increase by 20 per cent.

Coal-fired plants leave little room for renewables

Critics like Dong Liansai from Greenpeace East Asia say renewable energy will not be able to compete with the all-powerful coal lobby.

"Energy demand is a fixed number and if we are adding too many coal projects there is going to be less space for renewables to develop," he said.

Anger is also increasing for those who live around the power plants. Yan Jingron lives right next to Sanhe Power plant in Lang Fang, about 70 kilometres out of Beijing, but is deeply worried about what he sees pouring out of the plant's smoke stacks.

"Is it dust or chemicals? I know its not good for humans and I worry about my grandchild who goes to a kindergarten nearby the plant," he said.

"The Government should do something and not just give us empty promises. Every year it gets worse."

Today the northern winds have provided some relief to the residents of Beijing, blowing some of the pollution away. But they are bracing themselves for the next round of toxic smog which is meant to roll in later this week.

People in Beijing closely watch levels of PM2.5, particles measuring 2.5 microns across that are easily inhaled. (Reuters: China Stringer Network, file)

जहाँ है हरियाली ।
वहाँ है खुशहाली ।।

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