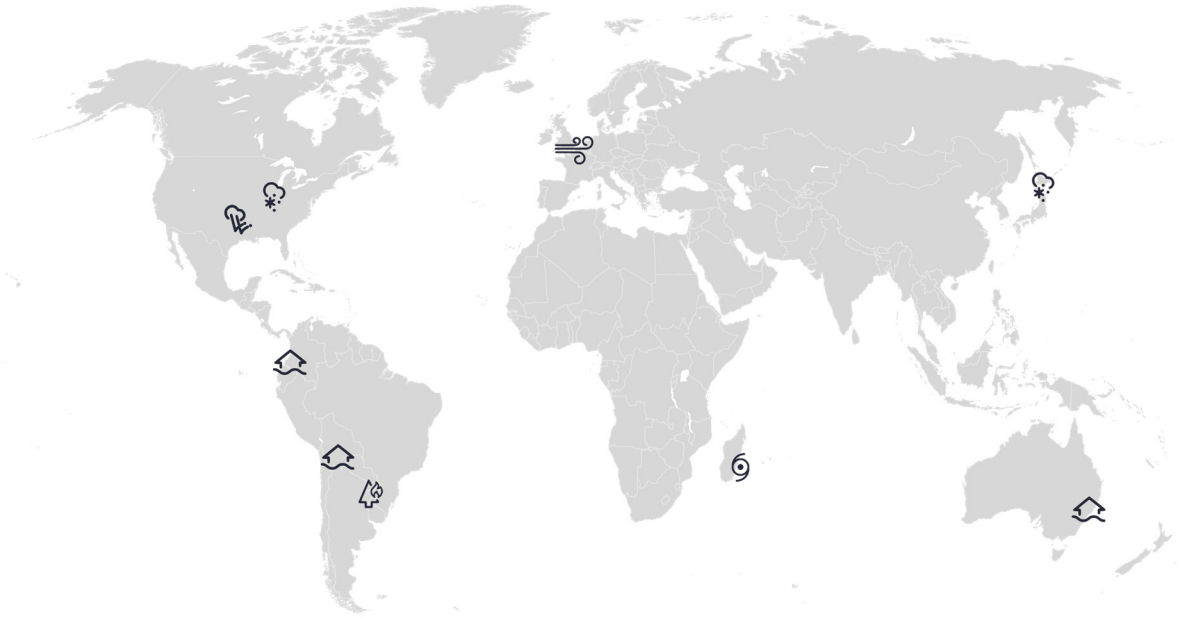
Weekly Cat Report

February 25, 2022

Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (USD)	Page
WS Dudley, Eunice & Franklin	Western & Central Europe	24+	Billions	3
Cyclone Emnati	Madagascar	0	Millions	9
Winter Weather / SCS	United States	0	100+ million	11
Winter Weather / SCS	United States & Canada	0	100s of millions	13
Flooding	Colombia	1+	Unknown	14
Winter Weather	Japan	2+	Millions	14
Flooding	Australia	2+	Millions	14
Flooding	Bolivia	4+	Unknown	14
Wildfire	Argentina	0	Millions	14

Please note that any financial loss estimate is preliminary and subject to change. These estimates are provided as an initial view of the potential financial impact from a recently completed or ongoing event based on early available assessments. Significant adjustments may inevitably occur.

Along with this report, we continue to welcome users to access current and historical natural catastrophe data and event analysis on Impact Forecasting's Catastrophe Insight website: http://catastropheinsight.aon.com

Europe: Windstorm Series - Dudley, Eunice & Franklin

Overview

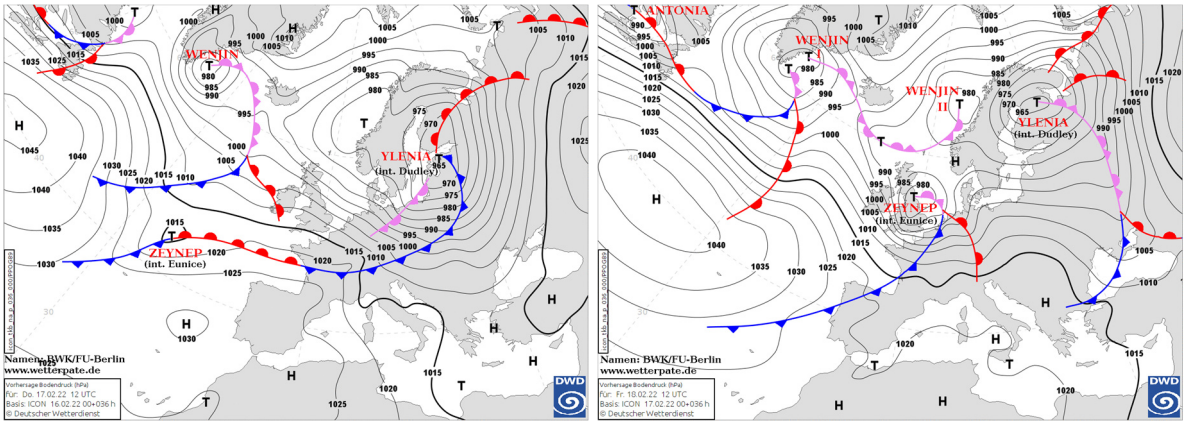
During the period of February 16-21, parts of Western and Central Europe were impacted by a sequence of intense windstorms named Dudley (Ylenia), Eunice (Zeynep), and Franklin (Antonia). Combined material losses from the three storms were substantial and will likely result in a multi-billion-dollar financial impact to the insurance industry. Additional impacts included significant disruption to the electrical grid and transportation. Storm Eunice alone left nearly 3 million customers without electricity across Europe. At least 24 people were killed in total from Dudley (7) and Eunice (17). The latter is likely to rank among the top 5 costliest EU Windstorms of the 21st Century, even though its eventual impact in the United Kingdom was much lower than initially anticipated.

Meteorological Recap

During the period of February 16-21, parts of Europe experienced impacts of a series of low-pressure systems, which developed in quick succession. Unusual atmospheric conditions, with prolonged state of positive North Atlantic Oscillation (NAO) and Arctic Oscillation (AO) indices in place, led to the development of a **sequence of windstorms** each named by the UK Met-Office (UKMO), Met Éireann and KNMI as **Dudley**, **Eunice,** and **Franklin**. Free University of Berlin named these areas of low pressure Ylenia, Zeynep, and Antonia respectively.

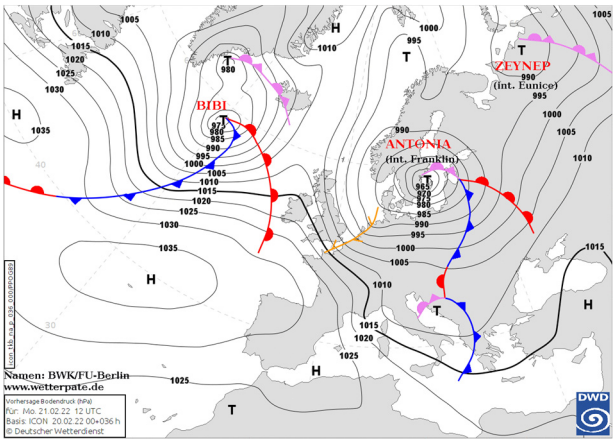
The weather pattern was driven by an active jet stream that propagated the low-pressure systems across anomalously warm waters in the North Atlantic Ocean and towards western sections of Europe. The strong frontal boundary that stretched through the North Atlantic became disturbed, which allowed for active cyclogenesis and the formation of several low-pressure systems in a short time span.

In days leading to February 16, **Storm Dudley** (Ylenia) began to rapidly intensify, and wind gusts near the main low and along the accompanying frontal boundary became amplified as it reached Ireland and the United Kingdom. The wind field later expanded to Central Europe on February 17, where it caused most wind-related impacts.



Surface pressure forecast for February 17 (left) and February 18 (right)
Source: DWD

Storm Eunice (Zeynep) developed in the wake of Dudley and underwent a rapid intensification prior to entering the British Isles and developing the most intense surface wind field in the vicinity of the English Channel. The storms central pressure fell by approximately 30 millibars during the 24-hour period leading to noon of February 18. Eunice was by far the most intense system of the three in the sequence and resulted in devastating impacts across Germany, the Netherlands, northern France, southern England and elsewhere.



Surface pressure forecast for February 21
Source: DWD

At this point, a stationary low-pressure system that would eventually be named **Storm Franklin** (Antonia) and track towards Europe on February 20-21, continued to deepen off the south-eastern coast of Greenland. As it reached the continent, the most widespread impacts were again observed in Germany, where significant gusts were recorded during the passage of the storm's cold front throughout the night of February 20-21.

Below is a selection of notable wind gust readings from respective meteorological agencies.

Dudley

Country	Station / Location	Peak Wind Gust
Czech Republic	Sněžka (high elevation)	181 kph (112 mph)
Germany	Brocken (high elevation)	152 kph (94 mph)
Germany	Kahler Asten (high elevation)	133 kph (83 mph)
United Kingdom	Capel Curig	130 kph (81 mph)
Poland	Dobrzyca	130 kph (80 mph)
United Kingdom	Drumalbin	119 kph (74 mph)

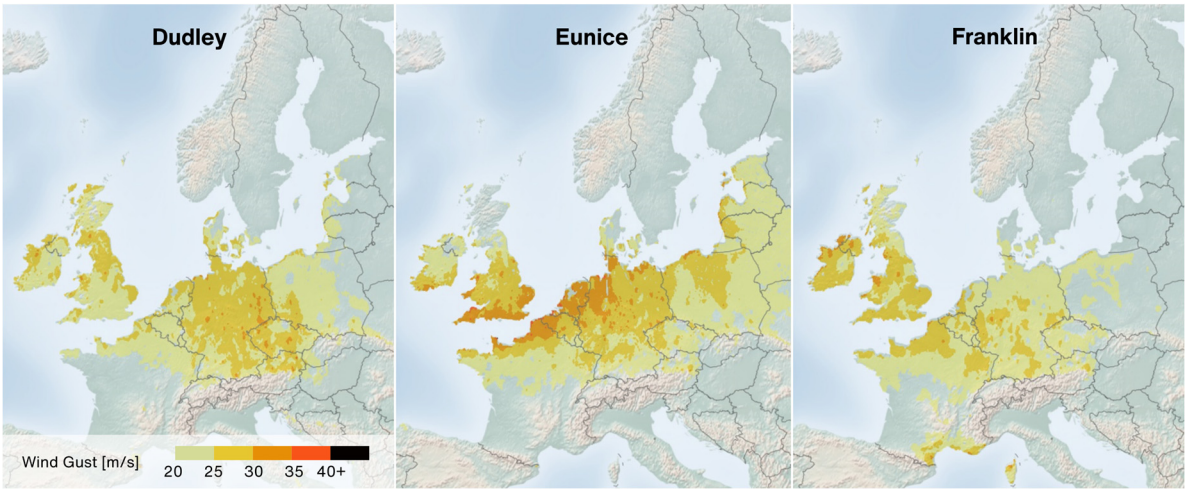
Eunice

Country	Station / Location	Peak Wind Gust
United Kingdom	The Needles	196 kph (122 mph)
Germany	Leuchtturm Alte Weser (coastal)	162 kph (100 mph)
Germany	Brocken (high elevation)	146 kph (91 mph)
Netherlands	Cabauw	145 kph (90 mph)
Netherlands	Houtribdijk	145 kph (90 mph)
United Kingdom	Isle of Portland	145 kph (90 mph)

Franklin

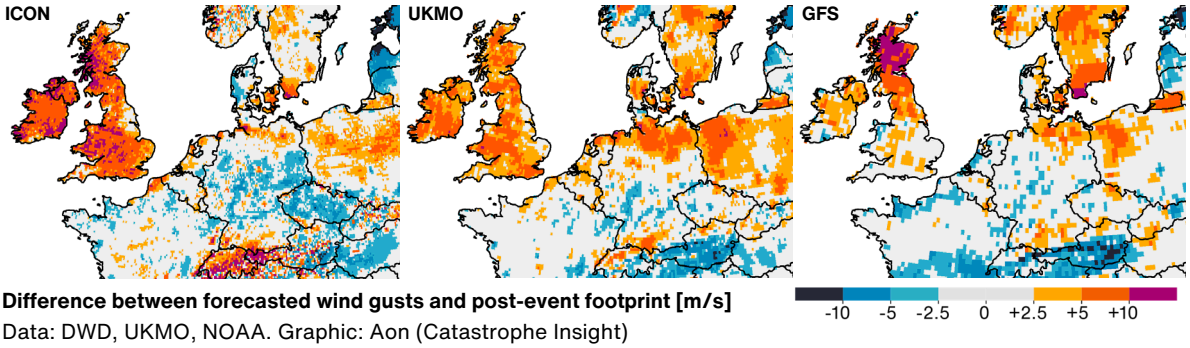
Country	Station / Location	Peak Wind Gust
Germany	Brocken (high elevation)	146 kph (91 mph)
Germany	Lüdenscheid	117 kph (73 mph)

As a part of the event response process, Impact Forecasting (IF) provided continual loss forecasts through its Automated Event Response (AER) service during the sequence, utilizing numerical weather prediction data and its newly updated windstorm model. In addition, station data of wind gusts provided a basis for generation of post-event wind gust footprints.



Footprints of the 3 windstorms modelled by Impact Forecasting
Graphic: Aon (Catastrophe Insight)

It is worth noting that several forecasting models and the UK Met Office anticipated much higher wind gusts in the United Kingdom, than eventually occurred. Despite the measurement of the highest wind gust on record for England, which was observed on the Needles on the Isle of Wight and reached 122 mph (196 kph or 54.5 m/s), values recorded inland were lower than initially expected. Above is the difference (in m/s) between maximum gusts forecasted by these weather prediction models for Windstorm Eunice, and post-event footprint modelled by Impact Forecasting. Shades of red signify overestimation of the forecast; shades of blue suggest underestimation on the side of the model.



Difference between forecasted wind gusts and post-event footprint [m/s]
Data: DWD, UKMO, NOAA. Graphic: Aon (Catastrophe Insight)

ICON (from the German Weather Service) and UK Met Office model showed the highest overestimation of gusts in England, whereas GFS performed generally well. Forecast footprints were utilized in pre-event analyses in the Impact Forecasting's Automated Event Response (AER) service.

Event Details

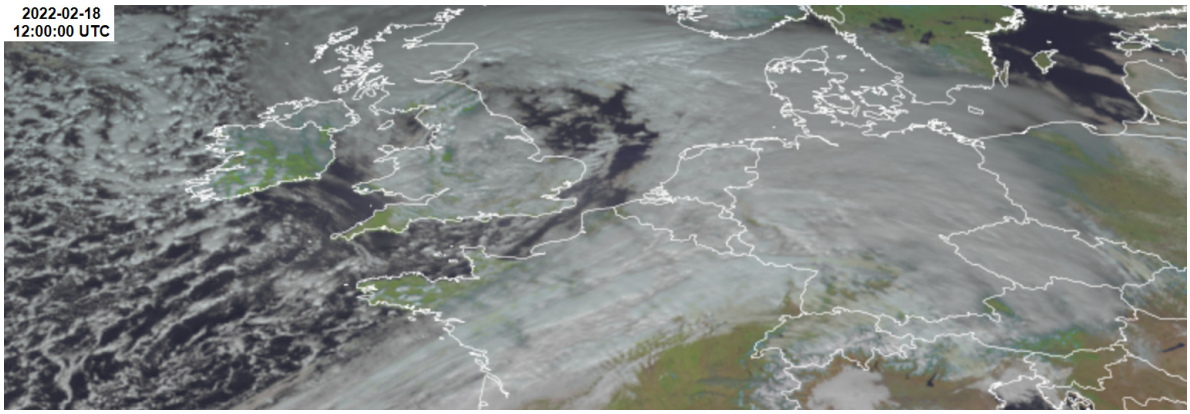
Windstorm Dudley (Ylenia)

Effects of Windstorm Dudley were described in last week's Weekly Report (February 18). Primary impacts from this system were observed in **Germany**, as majority of the national territory experienced winds gusting at more than 90 kph (56 mph). Despite relatively moderate intensity, extent of the wind provided for a significant cumulative number of property and motor claims across the country. Initial estimates from different industry groups indicated potential financial impact in the hundreds of millions EUR. Notable effects also occurred in the **Czech Republic**, which dealt with at least 300,000 power outages, thousands of storm-related incidents, and thousands of insurance claims. Additional impacts were reported from the **United Kingdom**, where the eventual impact was much lower than anticipated, and from **Austria, Belgium,** the **Netherlands** and **Poland.** At least seven people were killed in relation to the passage of Dudley in Poland (3), Germany (3) and the United Kingdom (1).

Windstorm Eunice (Zeynep)

Eunice brought significant damage and disruption to parts of the **United Kingdom** on February 18. However, the eventual impact in the country was much lower than initially anticipated based on outputs of various numerical weather prediction models, as mentioned above. England did record its highest gust on record of 122 mph (196 kph), but this measurement occurred on the Needles, an exposed rock formation on the Isle of Wight in the English Channel. Gusts inland did not reach the extremity seen during past historic storms like Daria in 1990. Still, notable damage occurred, particularly in the south of England. There were at least 500,000 power outages and notable disruption of traffic. Three people were killed. One fatality also occurred in **Ireland.**

Impacts in **France** were limited to the northern half of the country and most of the property losses were concentrated in the departments of Pas-de-Calais, Nord, Seine-Maritime or Manche. Eight people were heavily injured, at least 20 sustained light injuries due to falling trees, debris or in car accidents. According to national energy providers, there were 160,000 power outages in Pas-de-Calais alone.



February 18 satellite imagery of Storm Eunice (Zeynep) entering the North Sea
Graphic: NOAA / NASA / Colorado State Univ (RAMMB)

Significant material damage occurred in the Benelux region. Prior to the storm, meteorological authority in the **Netherlands** increased the degree of warning to the highest, red level. Virtually all the country experienced strong winds gusting at minimally 108 kph (67 mph). This resulted in widespread damage to property and motor. In a preliminary statement, the Dutch Insurance Association suggested that insured losses in the Netherlands due to the entire windstorm series, the vast majority of which occurred on February 18, could exceed €500 million ($562 million). Four people were killed, including three in the Amsterdam region. Two fatalities and significant material damage occurred in neighbouring **Belgium,** particularly in western parts of the country.

The most widespread damage occurred in **Germany,** as the most severe winds were recorded in north western and northern federal states. Impacts ranged from structural damage to roofs, chimneys, and roof tiles, and from treefalls. Insurers initially expected substantial impact, which will likely exceed EUR1.0 billion for the entire storm series, based on various publicly available estimates from different industry entities. Additionally, Hamburg experienced storm surge of more than 3.75 m (12.3 ft) above the mean high water on the morning of February 19, in the worst storm surge in the city since 2013. In total, three people were killed in the country.

Damage to roof of O2 Arena in the U.K.
Source: London Fire Brigade

Storm surge flooding near Hamburg (Germany) on February 19
Source: Hamburg Fire Department

The storm caused significant impacts in **Poland**. At least four people were killed and six were injured in the country, while emergency services conducted nearly 25,000 interventions, including 6,000 in Mazowieckie, 3,500 in Wielkopolskie, and around 3,100 in both Kujawsko-Pomorskie and Zachodniopomorskie. Initial information from disaster management officials as of February 20 included damage to roofs of nearly 5,200 structures, although total number of affected properties was expected to be significantly higher. Two of the fatalities occurred in relation to a crane collapse in Krakow. Hundreds of high- and medium-voltage lines were damaged or destroyed across the country - as a result, more than 1.2 million customers were left without power at the peak of the storm in the evening of February 19, including more than 335,000 in Mazowieckie

Additional impacts were observed in other countries. The southern part of **Denmark** was marginally affected; however, the resulting damage was not significant. In the **Czech Republic**, the impact from Eunice was lower than from Dudley, yet the continuation of gusty winds caused at least 26,000 power outages and resulted in additional volume of insurance claims.

In total, there were at least 17 fatalities in Europe because of Eunice – in the Netherlands (4), Poland (4), Germany (3), the United Kingdom (3), Belgium (2), and Ireland (1).

Windstorm Franklin (Antonia)

Downed tree in Nord (France) from Franklin
Source: Northern Civil Protection

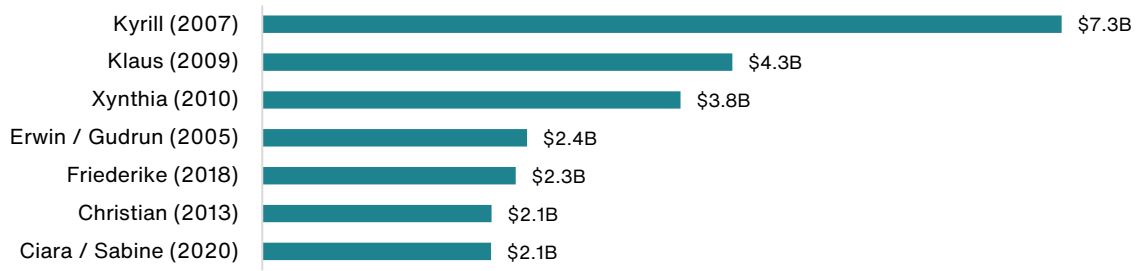
Franklin was the third storm to batter Western and Central Europe in less than a week. The first instances of damage were noted in the afternoon of February 20 in **Ireland**, where no less than 30,000 power outages occurred, and in the **United Kingdom.** In addition to strong winds, heavy rains resulted in localized flooding with several hundred flooded properties, particularly in Matlock, Otley, Leeds, and Herefordshire. The country continued to experience significant power cuts and transportation disruptions. The storm also caused relatively minor damage in northern **France and** killed at least two people. In a third storm in less than a week, **Belgium** and the **Netherlands** incurred additional losses, which were notably lower than those caused by Eunice. The most widespread damage, however, occurred again in **Germany.**

Financial Loss

The sequence of windstorms Dudley, Eunice and Franklin resulted in a substantial financial impact, which, according to various publicly available estimates made by insurance associations and other entities, will likely reach into the lower billions of EUR. The largest part of the losses was caused by Eunice. Even though its impact did not reach historical storms like Kyrill, Lothar or Daria, it will likely rank among the five costliest EU Windstorms of the 21st Century. Lower than expected losses in the United Kingdom are the primary reason why the total financial cost from Eunice will not reach the likes of Kyrill, Lothar or Daria, the possibility of which was suggested by some of the forecasting models earlier last week.

Preliminary estimates from the Dutch Insurance Association, which tentatively placed expected insured losses from the trio of storms at €500 million ($562 million), suggest that the Netherlands was the second most affected country.

Costliest EU Windstorms since 2000 - total insured losses in 2022 USD



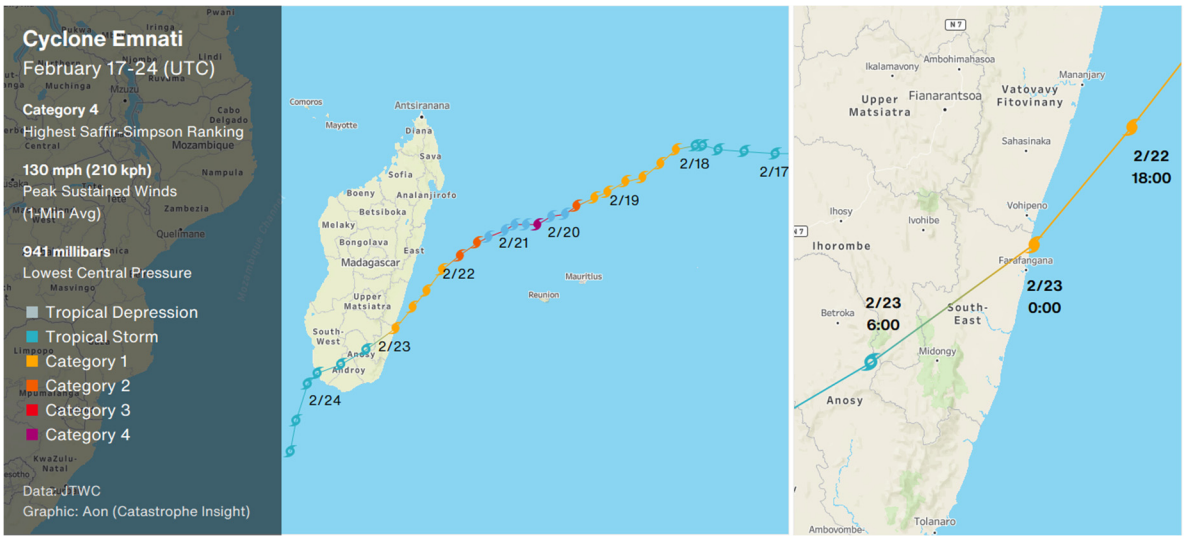
Data: Aon's Catastrophe Insight Database

Madagascar: Cyclone Emnati

Overview

Cyclone Emnati became the fourth named tropical system to make landfall in Madagascar in 2022. Emnati came ashore in south-eastern Madagascar on February 23 as a Category 1 equivalent storm on the Saffir-Simpson Hurricane Wind Scale, with maximum 1-minute averaged sustained winds reaching 120 kph (75 mph). Torrential rainfall and strong winds from Emnati caused notable inundation and damage in several southern regions of the island.

Meteorological Recap

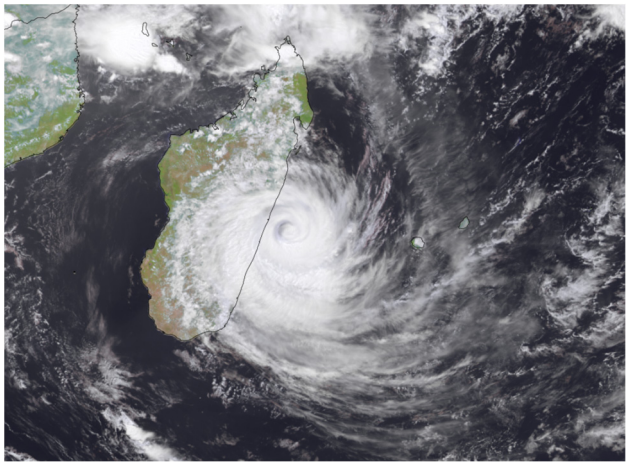


The Joint Typhoon Warning Center (JTWC) issued a tropical cyclone formation alert (TCFA) on February 15, as a consolidating system in the open waters of the Indian Ocean with convective banding was being monitored for additional development. The system was classified as a tropical depression by the Meteo-France Tropical Cyclone Center in La Reunion on February 16, while continuing to track westward around the northern periphery of a sub-tropical ridge. The cyclone was officially given the name Emnati by the Mauritius Meteorological Service on February 17.

Obtaining estimated maximum 1-minute averaged wind speeds of 120 kph (75 mph), Emnati strengthened into a Category 1 equivalent storm on the Saffir-Simpson Hurricane Wind Scale (SSHWS) by February 18. Steady intensification continued in the following days as Emnati churned west south-westward in a highly favourable environment charactered by warm sea surface temperatures and low vertical wind shear. Amid fluctuations in intensity, Cyclone Emnati exhibited a well-defined eye feature while passing north of Mauritius and La Reunion through February 20. The cyclone reached a peak 1-minute average intensity of 210 kph (130 mph) on February 20 by 12:00 UTC – equivalent to a Category 4 storm on the SSHWS.

After weakening due to eyewall replacement cycles and cooler waters off the eastern coast of Madagascar, Emnati made landfall in the early morning hours of February 23 along the south-eastern coast of Madagascar. At landfall, the cyclone maintained 1-minute averaged sustained wind speeds of 120 kph (75 mph) - a low-end Category 1 storm on the SSHWS. Prior to Emnati, Madagascar had been directly impacted by three named tropical cyclones in 2022; Ana, Batsirai, and Dumako.

Having emerged into cooler waters south-west of Madagascar, a weakened storm trekked south south-eastward on February 24 while battling increased vertical wind shear and dry air entrainment.



Emnati approaching Madagascar (February 22)
Source: NOAA/RAMMB

Event Details

Flooding in Vohipeno after the passage of Emnati
Source: BNGRC

Nearly 45,000 people were evacuated before Cyclone Emnati made landfall just south of Manakara on February 23. The cyclone weakened to a tropical storm over the rugged terrain and continued its track southwest, eventually exiting Madagascar in the overnight hours.

Red warnings, the highest-level warnings, were issued for at least 7 of the 22 regions in Madagascar. Torrential rain was reported in Ambovombe, Amboasary and Fort-Dauphin. The town of Vohipeno was heavily inundated and one of the national highways was destroyed. Detailed assessment of the damage caused by Emnati by local authorities were still ongoing, but higher rainfall was generally expected in localities impacted by the eastern side of the system.

Financial Loss

It remains too early at this time to provide an overall financial guidance of the impacts from Emnati. Many areas affected by Emnati were previously damaged by Batsirai, which came ashore as a Category 3 equivalent storm just weeks prior. The financial cost to property, infrastructure, and agriculture from the four storms which have struck Madagascar since the start of 2022 was anticipated to run well into the millions (USD).

United States: Winter Weather / SCS (February 20-25)

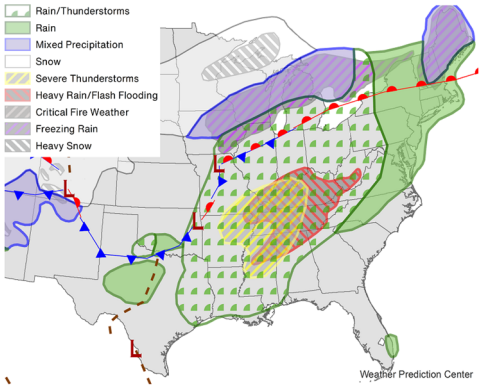
Overview

A pair of potent winter storms generated rounds of heavy snow and ice, flooding rainfall, severe thunderstorms, strong winds, and plummeting temperatures across much of the central and eastern United States between February 20-25. Severe thunderstorms associated with the first system brought damaging hail to parts of northern Texas. Notable ice accumulations were observed across the Southern Plains and Mississippi Valley by February 24. Total economic and insured losses during the stretch were each expected to individually exceed USD100 million.

Meteorological Recap

February 20-23

A deep upper-level Western trough, and an Arctic cold front aided in hazardous weather in the central and eastern United States between February 20-23. As Arctic air expanded into the contiguous U.S. on February 20-21, heavy snowfall, plummeting temperatures, and strong winds impacted the Northern Tier and Upper Midwest – where whiteout and blizzard conditions were reported.



U.S. Surface Analysis on February 22
Data: Weather Prediction Center (WPC)

A wave of low pressure intensifying along the front by February 21-23 led to rounds of snow, sleet, freezing rain, and rain across the Plains, Midwest, and Northeast. Maximum snowfall totals near the shores of Lake Superior approached 24 in (61 cm). In the wake of the front, well below normal temperatures settled across the central U.S., with sub-freezing temperatures cited in the Southern Plains.

Concurrently, favourable upper-level dynamics and moisture from the Gulf of Mexico aided in localized flooding from Texas and Oklahoma into the Ohio Valley - regions which have endured multiple bouts of heavy rainfall in recent weeks. The Storm Prediction Center (SPC) indicated a Slight Risk (level 2 out 5) for severe thunderstorms from north Texas toward the Ozarks on February 21, which evolved eastward on February 22 into the Tennessee Valley and Southeast. The potential for thunderstorms in these regions was elevated by an upper-level shortwave trough and the approaching frontal boundary.

February 23-25

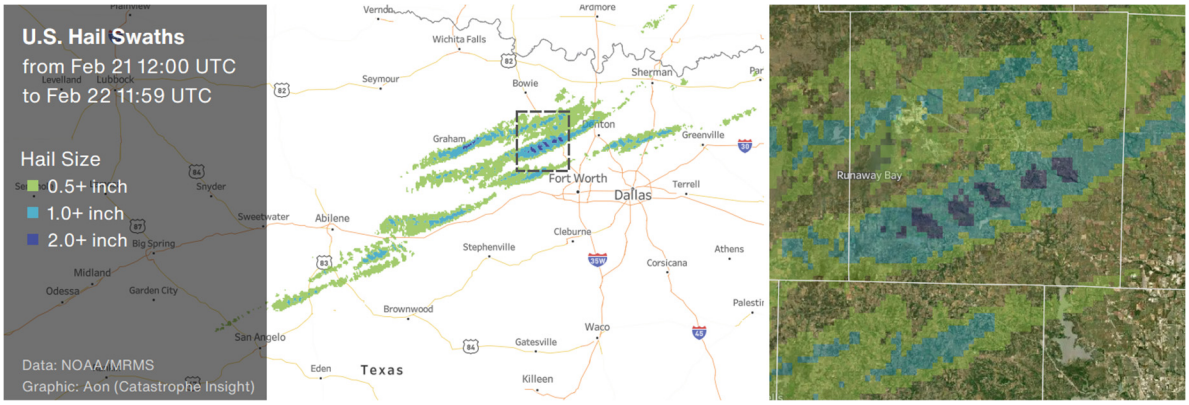
As the first system exited off the East Coast, a second storm in the Southern Rockies moved eastward and redeveloped in the Tennessee Valley between February 23-24. On February 23, heavy snowfall and windy conditions resulted across much of the Southwest. Concurrently, a preceding wave of wintry precipitation, falling into sub-freezing surface temperatures, impacted the Southern Plains and Middle Mississippi Valley. By February 24, significant ice accumulations were reported from north Texas into

the Middle Mississippi Valley, with a swath of accumulating snowfall further north. Hazardous winter weather evolved into the Northeast and New England through February 25.

Event Details

February 20-23

Severe convective storms resulted in large hail across northern **Texas** on February 21, particularly in parts of Parker, Wise, Denton, and Collin Counties. Hail exceeding 2.0 in (5.1 cm) were reported in Wise County near Paradise. Wind driven hailstones caused numerous reports of damage to windows, siding, and vehicles in the area. In north-eastern **Arkansas**, non-tornadic winds, with gusts reaching 60 mph (96 kph), resulted in property damage, toppled trees, and downed power lines. In western **Kentucky**, flash flooding triggered riverine flooding and multiple closed roadways.



In **North Dakota**, a stretch of Interste-94 west of Fargo was temporary shuttered after a weather-related multi-vehicle accident resulted in no less than six injuries on February 21. In **Minnesota**, State Patrol responded to dozens of traffic accidents on February 22, which resulted in at least 10 injuries. Icy conditions caused treacherous travel and traffic incidents across central **Michigan** on February 22.

February 23-25

As many as 1,600 flights into or out of the United States were cancelled on February 23, while at least 2,000 flight cancellations occurred on February 24. In **Texas**, Dallas Area Rapid Transit (DART) suspended trains service on February 23 due to the inclement weather. Deteriorating conditions made stretches of major interstates in **California** and **Arizona** impassable. By February 24, icy conditions in eastern **Arkansas** contributed to tens of thousands of customer power outages, and numerous traffic accidents.

As of this writing, impacts from the winter storm remained ongoing. If necessary, additional updates will be provided in future Weekly Reports.

Financial Loss

Total economic and insured losses during the stretch were each expected to individually exceed USD100 million. Most hail and wind related damage in the Southern Plains were anticipated to be covered by insurers.

U.S. & Canada: Winter Weather / SCS (February 16-19)

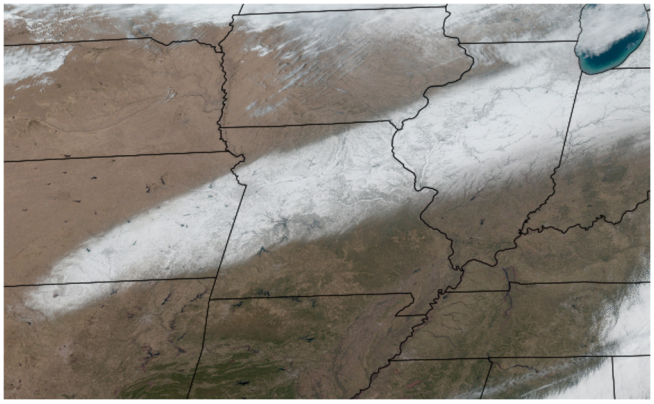
Overview

A potent winter storm which impacted parts of the United States and southern Canada through February 19 generated widespread hazards that included flooding, treacherous travel, damaging winds, and convective storms. Total economic losses were expected to be in hundreds of millions (USD).

For a complete meteorological and event recap, please see last week's Weekly Cat Report.

Meteorological Recap

The robust storm system which brought damaging winds, flooding, thunderstorms, and ice/snow to the central and eastern United States and southern Canada, continued to advance north-eastward before gradually exiting the Canadian Maritimes by February 18-19.



Swath of heavy snowfall visible on satellite imagery (Feb 18)
Source: NOAA/RAMMB

In the United States, snowfall totals topping 10 in (25 cm) were measured across central Missouri and Illinois by February 18. Storm total rainfall approached and exceeded 3.0 to 4.0 in (75 to 100 mm) in the Middle Mississippi Valley. Elsewhere, severe thunderstorms generated impactful straight-line winds in the Mid-South and Southeast and included confirmed tornadoes in Alabama. In Canada, rapidly plummeting temperatures in the wake of the system created further hazards and flash freezes, particularly in the Maritime Provinces.

Event Details

In the **United States**, heavy precipitation combined with high winds left at least a hundred thousand customers across the Northeast without electricity by February 18. In **Illinois**, State Police shut down a stretch of Interstate-39 from Normal to Minonk due to traffic accidents involving at least 100 vehicles on February 17. Floodwaters inundated multiple homes in western **Kentucky**. In **Alabama**, at least three tornadoes were confirmed on February 17: EF1 (2), EF0 (1). An EF1 tornado with maximum estimated wind speeds approaching 95 mph (150 kph) resulted in notable damage to trees, utility lines, and homes in the vicinity of Highway-25 near the City of Leeds.

In **Canada**, flooding occurred across the Greater Toronto Area (GTA) and included at least 100 homes in the Brampton neighbourhood which were evacuated near the swollen Credit River. Numerous roadways across southern **Ontario** and **Quebec** were inundated, and multiple instances of basement flooding and property damages were reported. High winds knocked out electricity to thousands of people – particularly in **Nova Scotia**, where outages affected no fewer than 30,000 customers. Heavy rainfall and a subsequent flash freezing closed dozens of roadways across **Atlantic Canada** through February 19.

Natural Catastrophes: In Brief

Flooding (Colombia)

Heavy rainfall generated instances of flash flooding across southwestern Colombia since February 18. Localities in the Nariño Department, including Santacruz, Túquerres, Los Andes, San Pablo, and Barbacoas, were among the most affected. In San Pablo, one-person remains missing after being swept away by floodwaters. As many as 550 homes in the municipality were damaged to varying degrees. In Barbacoas at least 3,800 people were affected, and 1,120 homes were impacted by flooding and landslides.

Winter Weather (Japan)

A strong blizzard hit Hokkaido, northern Japan between February 21-22. Wind gusting beyond 108 kph (67 mph) and record-breaking snowfall were observed in many parts of Hokkaido. Around 1,100 trains and 200 flights were cancelled. The thick snow caused road accidents in Hokuto city involving 80 cars in total and no fewer than 20 passengers were injured. At least two lives were lost due to the blizzard. Economic losses were expected to be in the millions (USD).

Flooding (Australia)

Intense thunderstorms brought heavy rainfall and gusty winds to Australia's Sydney metropolitan area on February 22. Sydney's Inner West including Marrickville, Parramatta, and Wolli Creek, was particularly drenched with floodwaters on roads and at train stations. Elsewhere in southeast Queensland, more than 300 mm (11.8 in) of rain fell in just six hours near Gympie. At least two people drowned, while several people were unaccounted for. The Bureau of Meteorology (BoM) forecast the wet weather over the East Coast to last through February 25. Economic losses were likely to reach into the millions (USD).

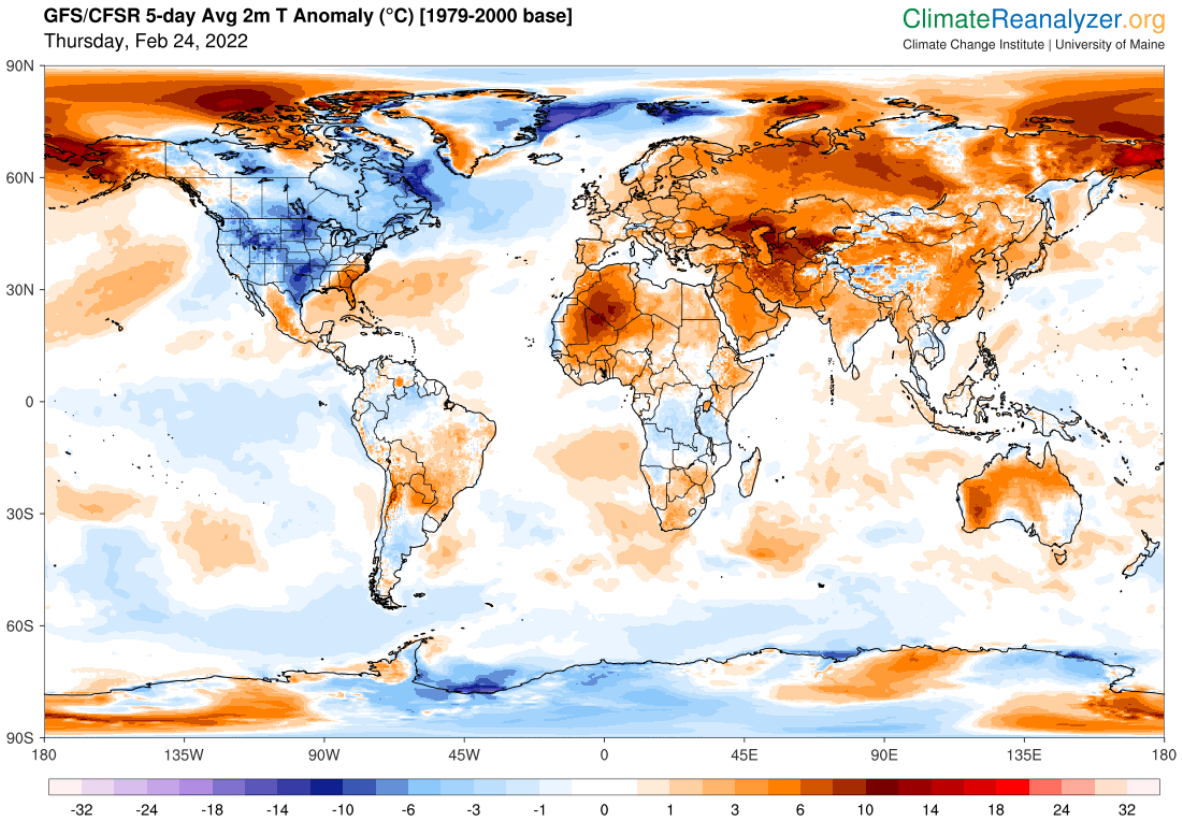
Flooding (Bolivia)

Torrential rainfall in the Tarija Department in south-eastern Bolivia on February 20 claimed at least four lives, while dozens remained missing. Multiple injuries were confirmed. Heavy rainfall resulted in the overflow of the Itayuro Stream, which caused a barrage of water, mud, and debris. The flooding affected electricity and water supplies in the department, where nearly 90 percent of roadways were impassable. Up to 2,500 people were impacted, and nearly 100 homes damaged to varying degrees. Elsewhere, additional damage was incurred in the Cochabamba and Santa Cruz Departments.

Wildfires (Argentina)

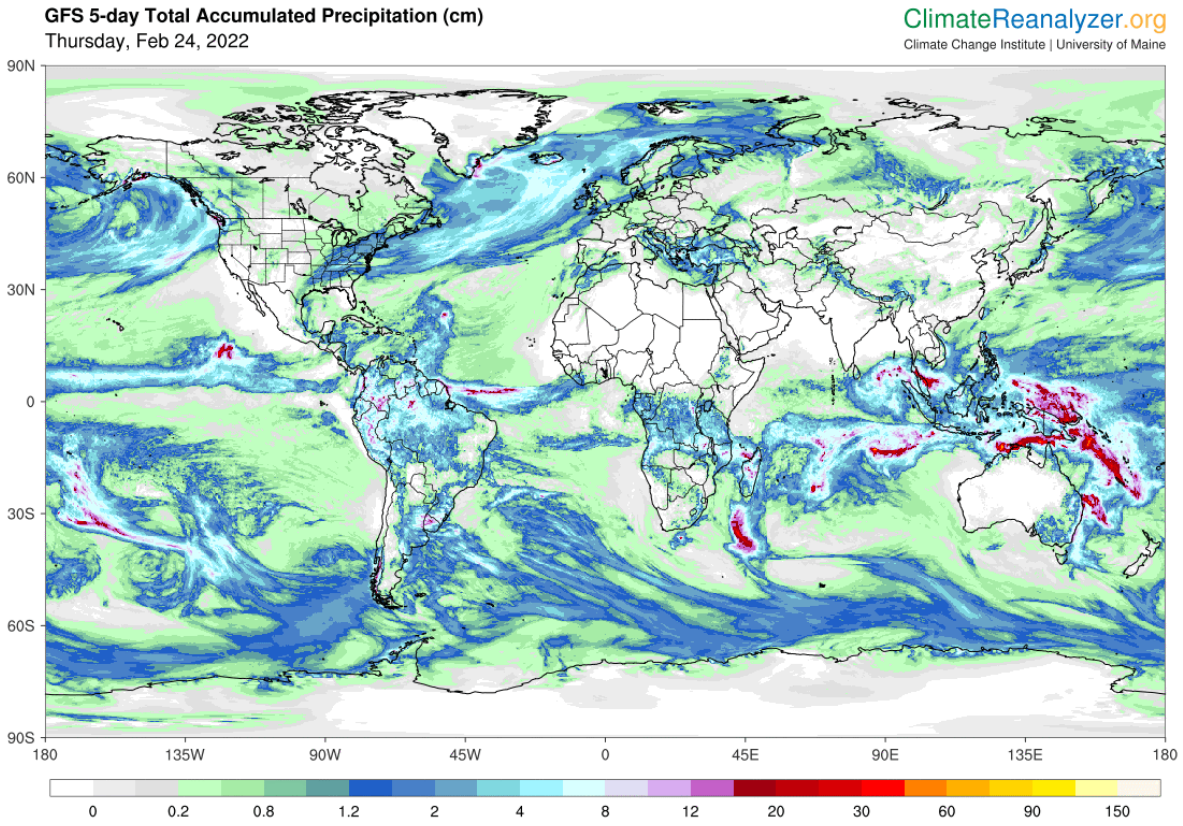
Wildfires in the northern Argentinian province of Corrientes have affected at least 800,000 hectares (1.98 million acres) since the beginning of the year – accounting for nearly 10 percent of the provincial territory. The out-of-control fires were aided by hot and dry conditions enhanced by a multi-year drought. Significant impacts to local agriculture and livestock were reported. The fires additionally threatened and destroyed protected habitats and wildlife in Ibera National Park. Economic losses were expected to reach well into the millions (USD).

Global Temperature Anomaly Forecast



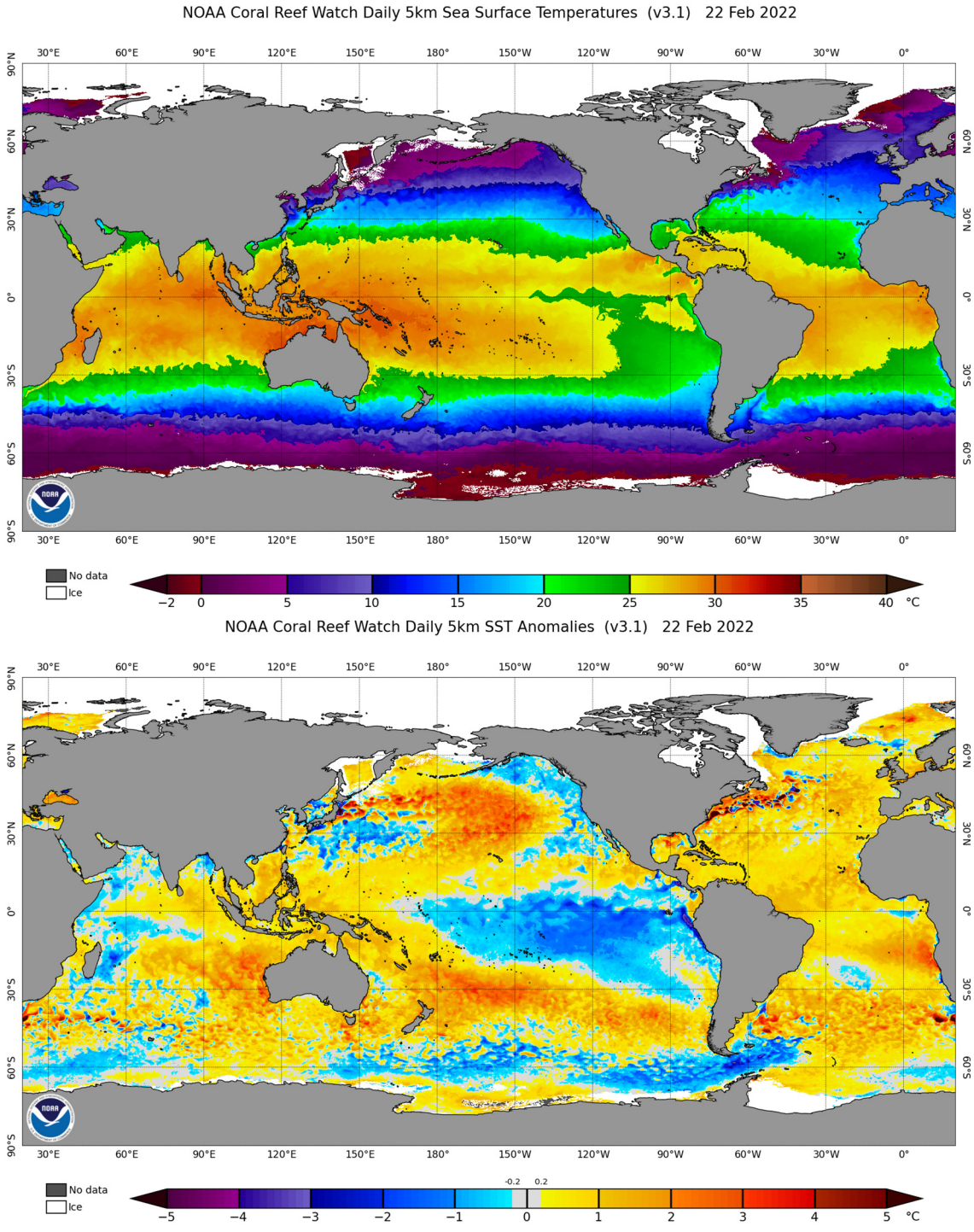
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Anomaly Forecast



Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

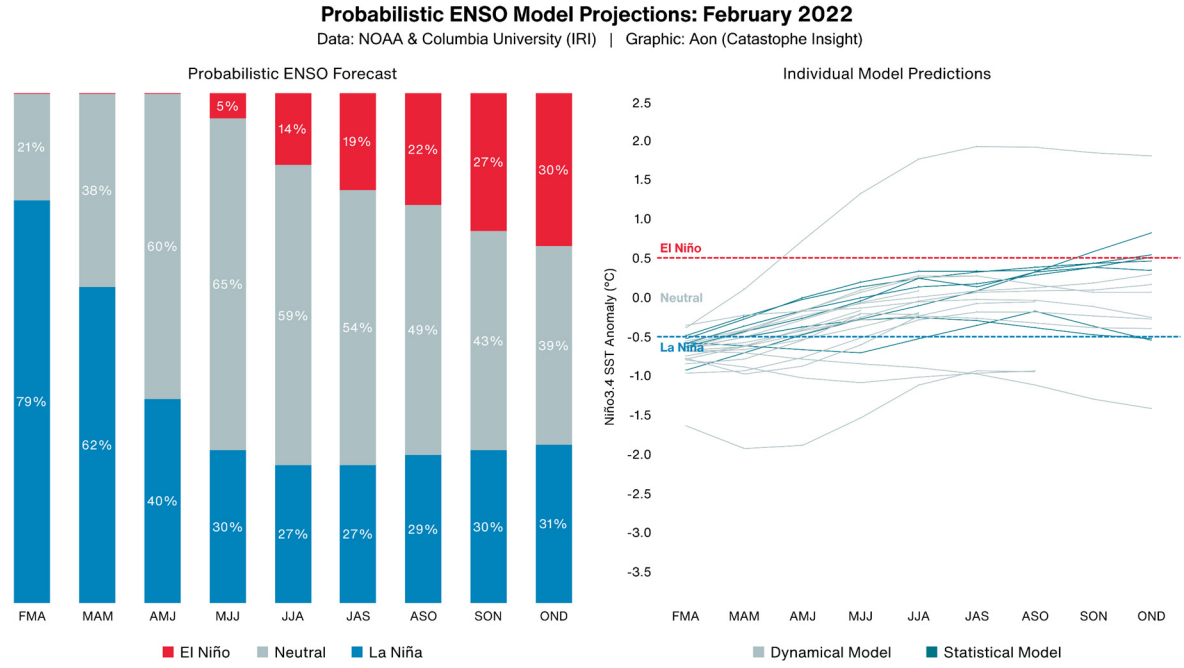
Weekly Sea Surface Temperature (SST) Maps (°C)



El Niño-Southern Oscillation (ENSO)

Overview

La Niña conditions have returned in the Central and Eastern Pacific Ocean, and NOAA has issued a “La Niña Advisory”. NOAA cites a 77 percent chance of La Niña conditions persisting into the Northern Hemisphere spring months, and a 56 percent chance of transitioning to ENSO neutral conditions by late spring or summer (May to July).



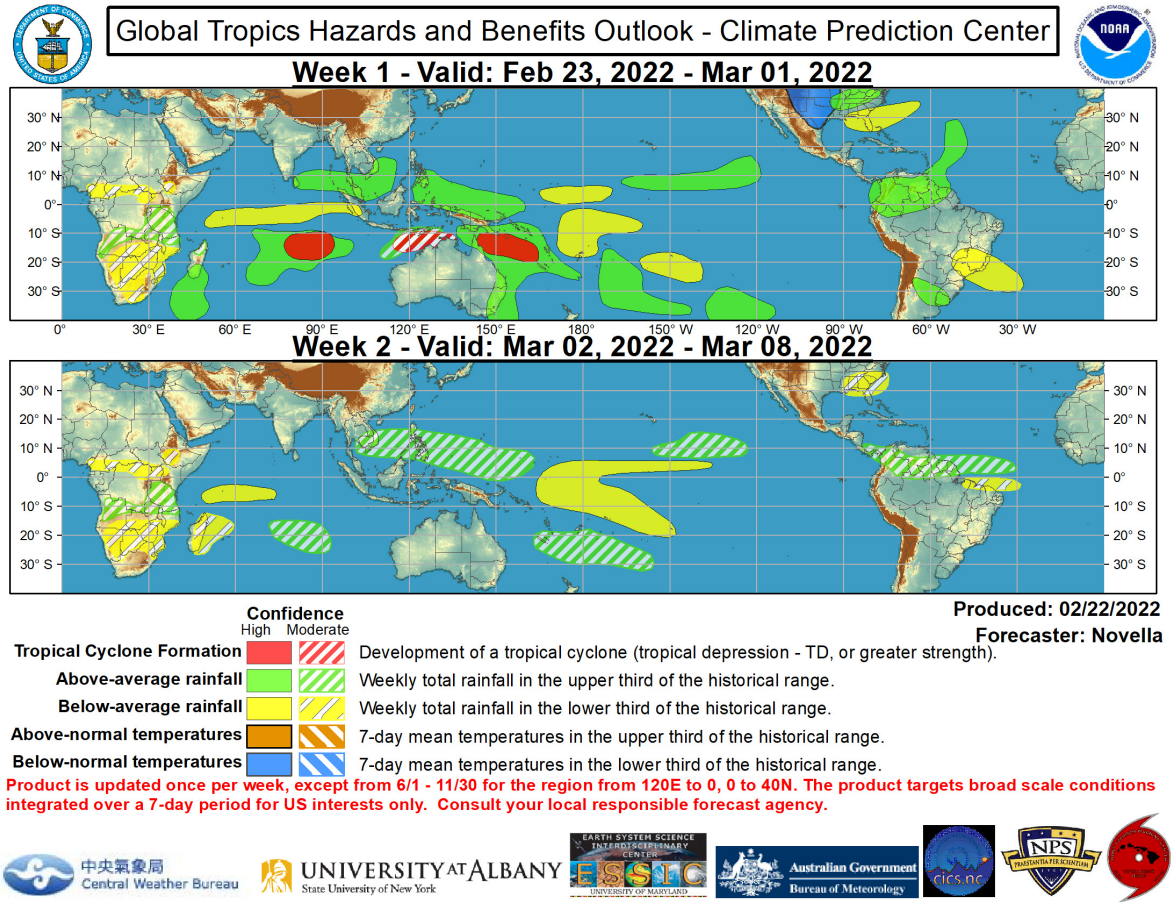
El Niño: *Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.*

La Niña: *Cool phase of an ENSO cycle. Sea surface temperatures of -0.5°C occur across the east-central equatorial Pacific.*

Neutral: *A period when neither El Niño nor La Niña conditions are present.*

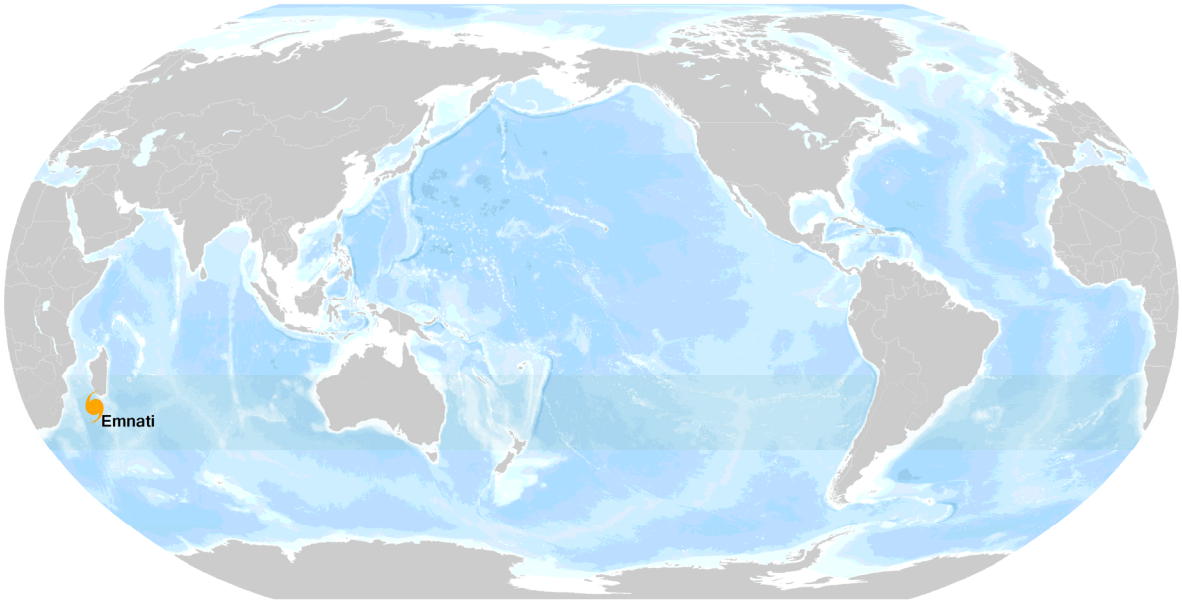
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

Global Tropics Outlook



Source: Climate Prediction Center (NOAA)

Current Tropical Cyclone Activity



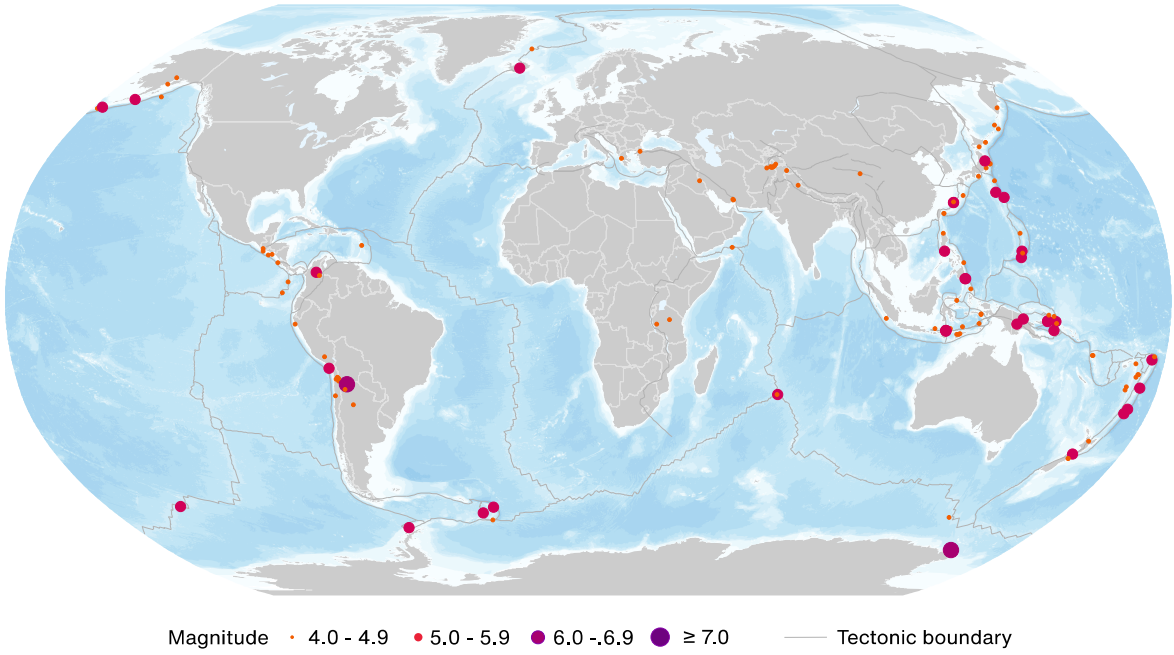
Tropical Depression Tropical Storm Category 1 Category 2 Category 3 Category 4 Category 5

Storm Name	Location	Winds	Location from Nearest Land Area
CY Emnati	28.7S, 41.8E	50 mph	385 mi (620 km) S from Toliara, Madagascar

* TD: Tropical Depression, TS: Tropical Storm, HU: Hurricane, TY: Typhoon, CY: Cyclone
** N: North, S: South, E: East, W: West, NW: Northwest, NE: Northeast, SE: Southeast, SW: Southwest

Source: National Hurricane Center, Joint Typhoon Warning Center, Central Pacific Hurricane Center (NOAA)

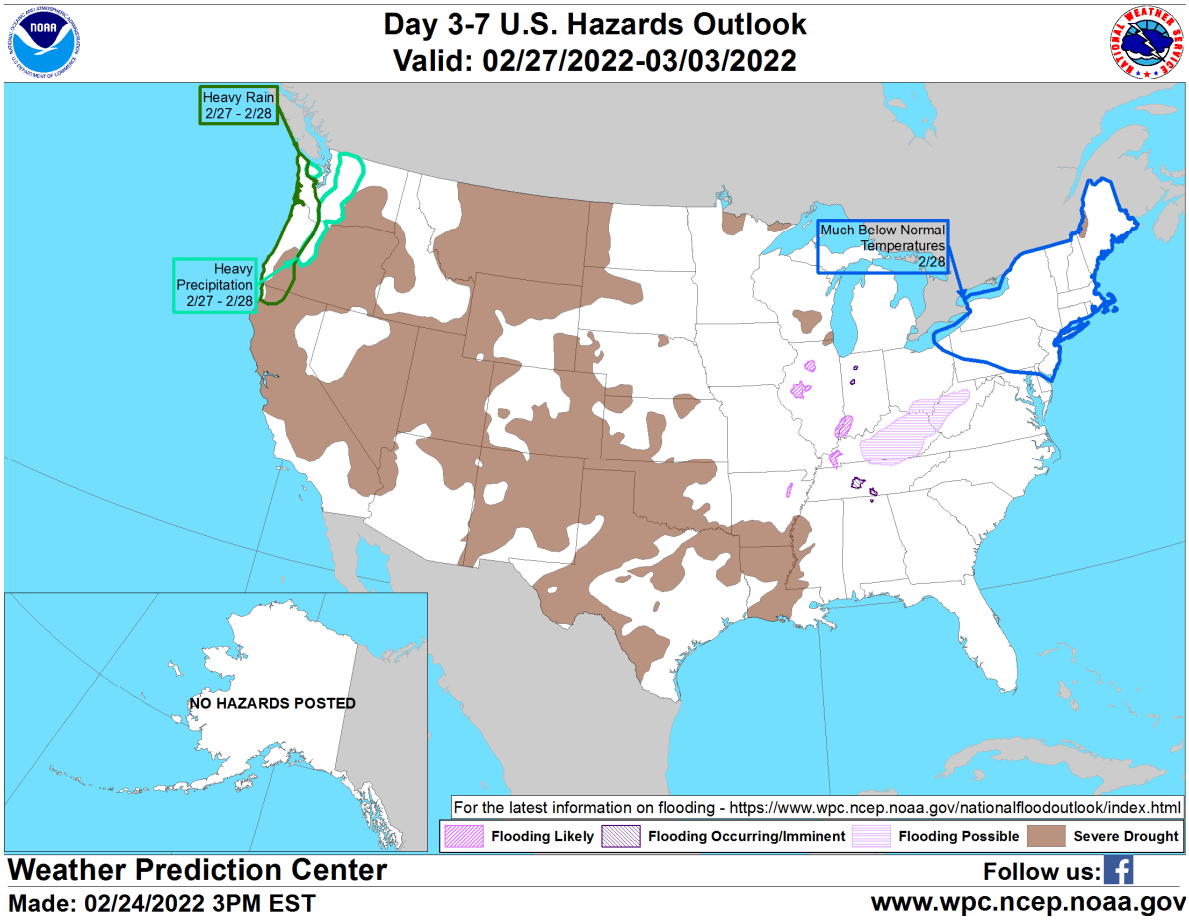
Global Earthquake Activity (≥M4.0): February 18 - 24



Date (UTC)	Location	Magnitude	Epicenter
2/21/2022	69.76S, 165.43E	6.3	Balleny Islands region
2/22/2022	22.66S, 66.27W	6.0	58 km (36 mi) W of Abra Pampa, Argentina

Source: United States Geological Survey

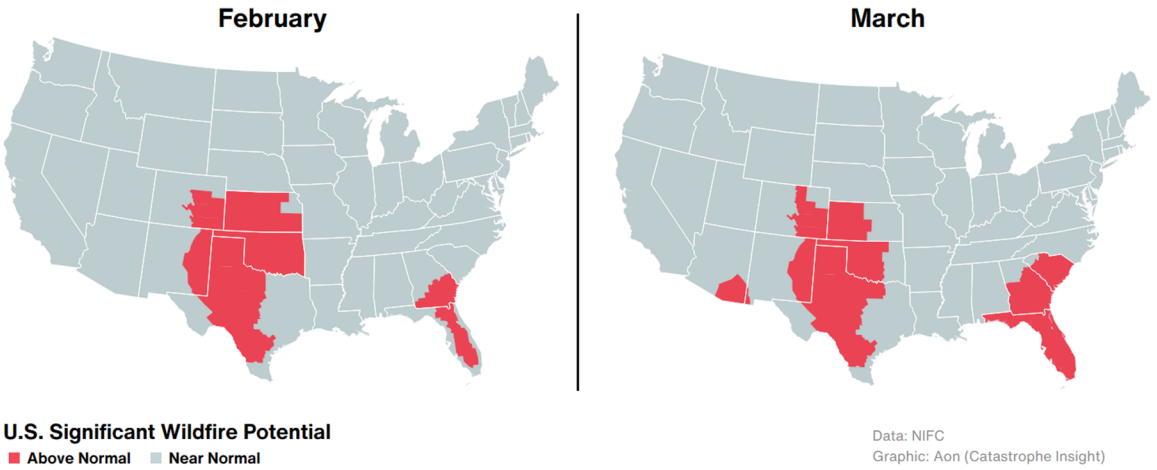
U.S. Hazard Outlook



- In the wake of a cold front, much below normal temperatures will settle across the Northeast and New England on February 28.
- Favorable onshore flow will bring heavy rainfall to the coastal Pacific Northwest on February 27-28, with mixed precipitation and heavy snowfall likely in the higher elevations of the Olympics and Cascades.
- Flooding remains a concern in pockets of the Tennessee and Ohio Valleys, while severe drought persists in parts of the West and Southern Plains

Source: Weather Prediction Center (NOAA)

U.S. Wildfire: Significant Fire Risk Outlook & Activity



Annual YTD Wildfire Comparison: February 18*

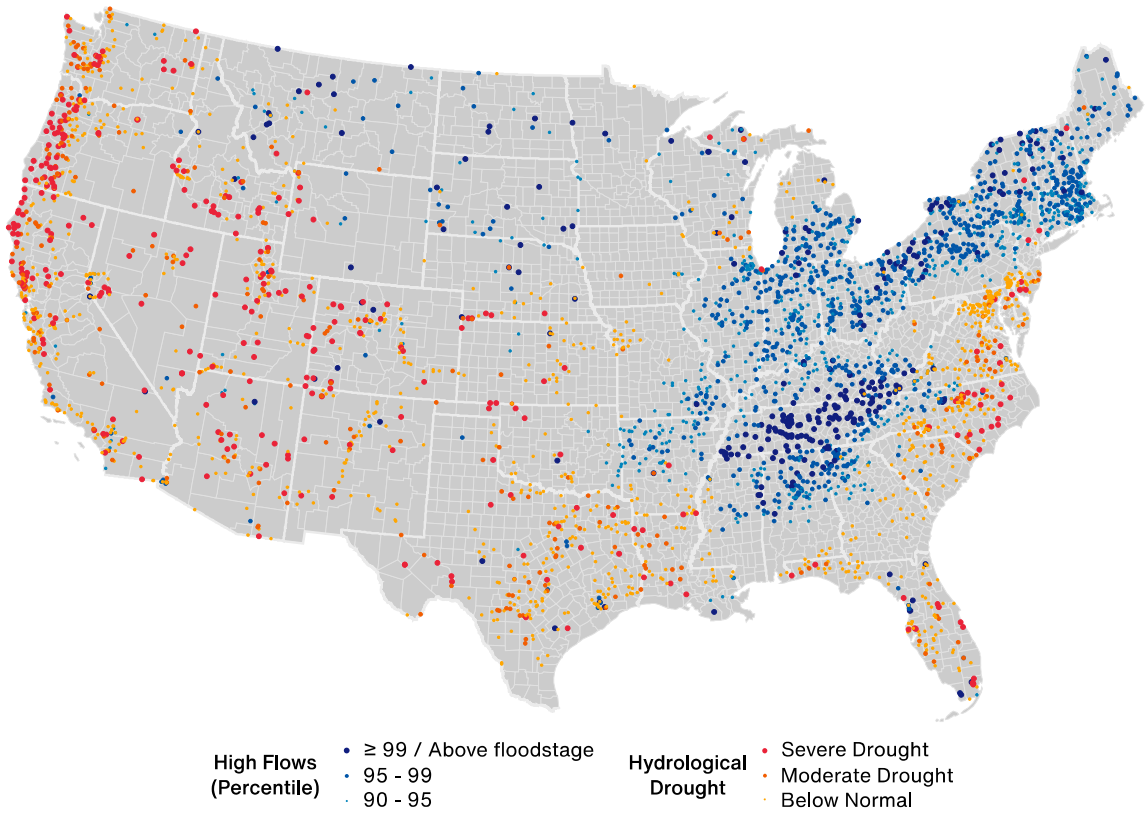
Year	Number of Fires	Acres Burned	Acres Burned Per Fire
2018	5,211	112,729	21.63
2019	1,777	24,905	14.02
2020	2,073	37,609	18.14
2021	2,986	60,064	20.12
2022	5,544	116,401	21.00
10-Year Average (2012-2021)	**3,202**	**63,041**	**19.69**

Top 5 Most Acres Burned by State: February 24

State	Number of Fires	Acres Burned	Acres Burned Per Fire
Texas	1,487	46,028	30.95
Oklahoma	436	25,959	59.54
Mississippi	573	21,721	37.91
Alabama	354	11,935	33.71
Florida	650	9,750	15.00

*Most recent NIFC update
Source: National Interagency Fire Center

U.S. Current Riverine Flood Risk



A ≥99th percentile indicates that estimated streamflow is greater than the 99th percentile for all days of the year. This methodology also applies for the other two categories. A steam in a state of severe drought has 7-day average streamflow of less than or equal to the 5th percentile for this day of the year. Moderate drought indicates that estimated 7-day streamflow is between the 6th and 9th percentile for this day of the year and 'below normal' state is between 10th and 24th percentile.

Top 5 Rivers / Creeks: Highest Percentile for Water Height

Location	Current Stage (ft)	Percentile
Pemigewasset River at Plymouth, New Hampshire	10.94	99.15
Pembina River at Neche, North Dakota	3.38	99.12
Ashuelot River at Hinsdale, New Hampshire	6.57	99.10
Dolores River at Dolores, Colorado	2.67	99.10
Wind River at Riverton, Wyoming	6.44	99.07

Source: United States Geological Survey

Source Information

Europe: Windstorm Series - Dudley, Eunice & Franklin
Storm Eunice: thirteen dead in Europe and significant material damage*, Le Parisien*
Summary of the hurricane night: devastation, three dead - but warnings are having an effect. *Focus*
Storm Eunice leaves a devastating trail in Europe: no fewer than 15 dead. *De Telegraaf*
UK Met Office
Free University of Berlin
Deutscher Wetterdienst
Government Security Center, Poland
Dutch Association of Insurers

Madagascar: Cyclone Emnait
Joint Typhoon Warning Center (JTWC)
Category 3 Tropical Cyclone Emnati headed for vulnerable Madagascar, *Yale Climate Connections*
National Office for Risk and Disaster Management in Madagascar

United States & Canada: Winter Weather / SCS
U.S. National Weather Service
U.S. Storm Prediction Center
Flight Aware
U.S. faces extreme cold blast, stormy weather in week ahead, *The Washington Post*
Roads Closed, Schools Shut Down, Flights Canceled, *The Weather Channel*

Natural Catastrophes: In Brief
Colombia – 1 Missing After Flash Floods in Nariño, *Floodlist*
Heavy snow batters northern Japan, disrupts traffic, *The Mainichi*
Australia – Deadly Flash Floods in Queensland After 300mm of Rain in 6 Hours, *Floodlist*
Flood in Bolivia leaves 4 dead and at least 10 missing, *DW*
Bolivia – 20 Feared Missing After Floods in Tarija, *Floodlist*
Argentina fires rage on in Corrientes, burning an important wetland, *Reuters*
The Government sends some $350 million to Corrientes through ATN, *La Nacion*

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