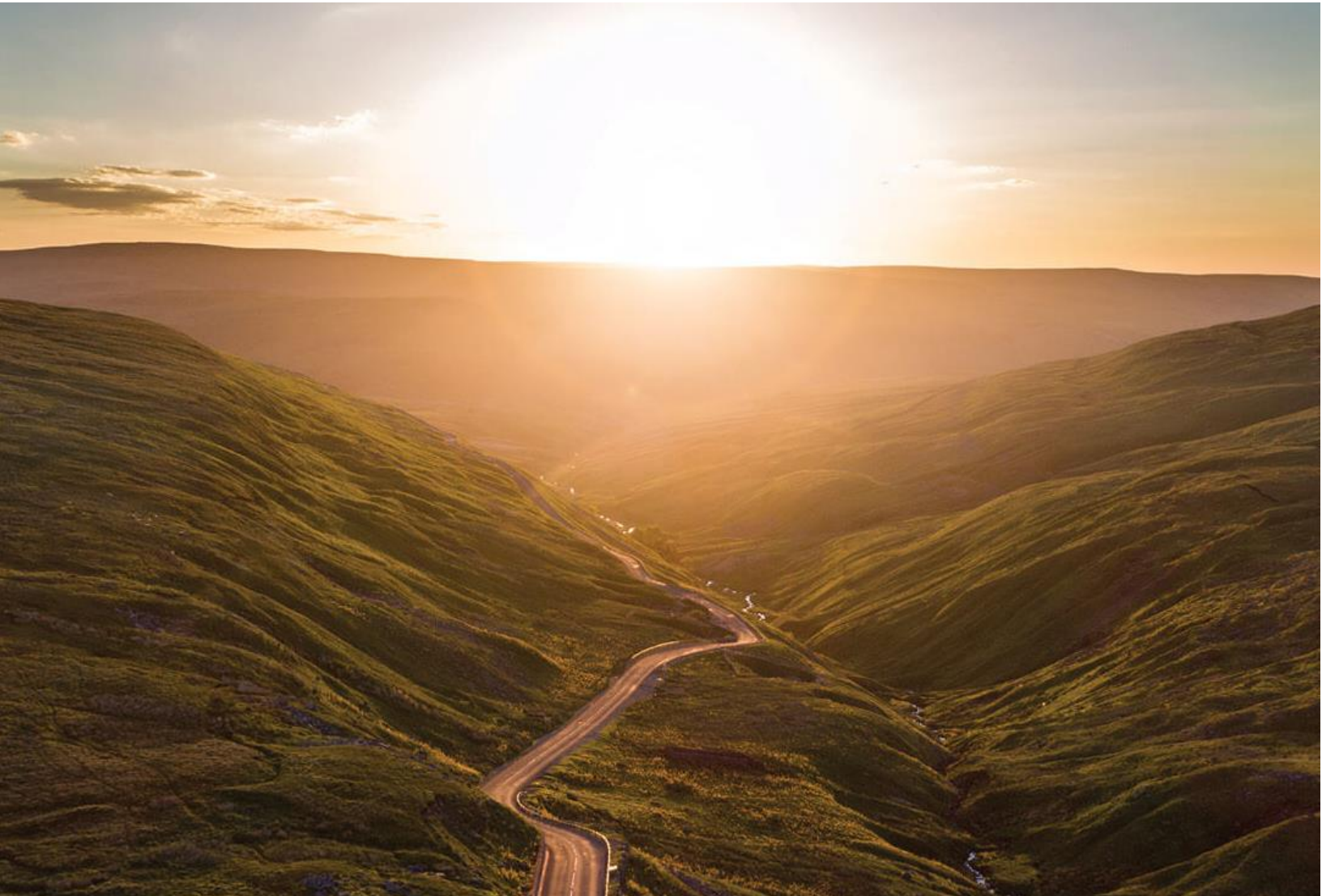


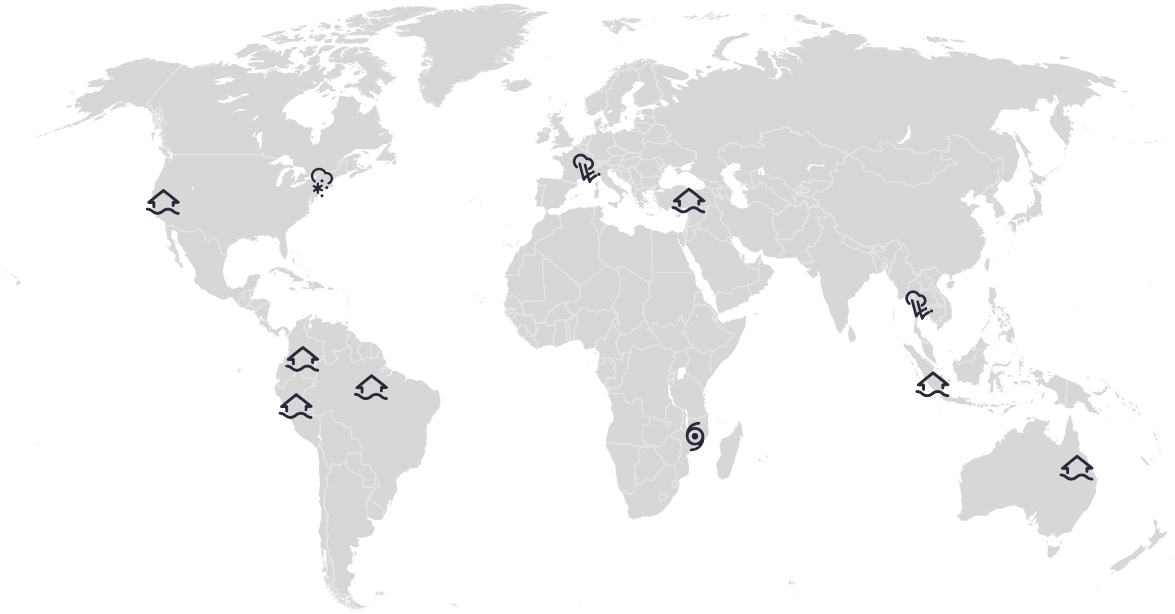
**AON**

# **Weekly Cat Report**

March 17, 2023



## Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (\$)	Page
<b>Flooding &amp; Winter Weather</b>	United States	2	10s of millions	3
<b>Cyclone Freddy (Update)</b>	Mozambique, Malawi	308+	100s of millions	6
<b>Severe Convective Storm</b>	Western & Central Europe	0	10s of millions	7
<b>Flooding</b>	Peru	6+	Unknown	9
<b>Flooding</b>	Australia	0	Millions	9
<b>Flooding &amp; Landslide</b>	Indonesia	3+	Negligible	9
<b>Landslide</b>	Brazil	8+	Negligible	9
<b>Flooding</b>	Colombia	0	Millions	9
<b>Severe Convective Storm</b>	Thailand	0	Unknown	9
<b>Flooding</b>	Turkey	17+	Millions	10

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. All losses in US dollars (\$) unless noted otherwise.

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>

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## United States: Flooding & Winter Weather

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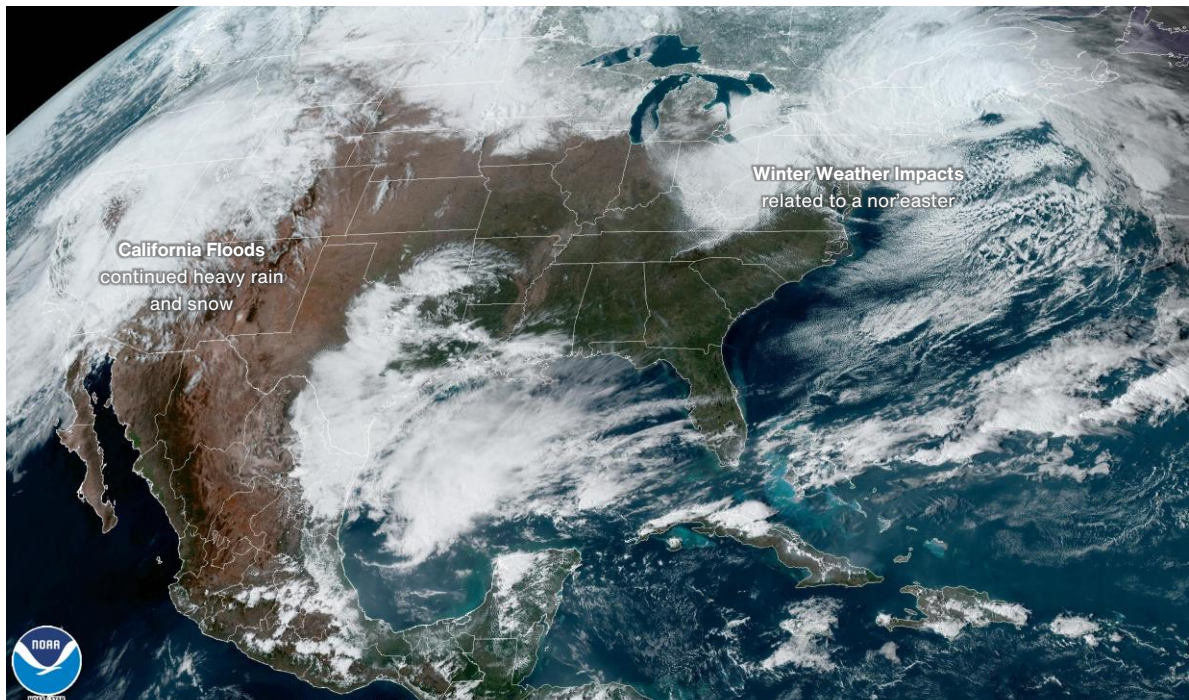
### Overview

A new round of torrential precipitation related to atmospheric rivers has triggered additional flooding in California since March 9. Hundreds of thousands experienced power outages and at least two people died, as additional damages to buildings and local infrastructure were incurred. Separately, much of the Northeast and New England was affected by wintry weather as a first nor'easter of the season developed off the Atlantic coast. Total economic and insured losses from both events were initially expected to reach into the tens of millions USD.

### Meteorological Recap

Atmospheric rivers, the tenth and eleventh this season since December 26, has brought a significant amount of precipitation on U.S. western coast between March 9-15, particularly into California that has already been affected by excessive rainfall and heavy snowfall at higher elevation several times since the beginning of the year. Additional hazards were related to strong winds, which peaked at exposed, montane locations at 97 mph (156 kph) – San Francisco Airport recorded a gust of 74 mph (119 kph).

Between March 13 and 15, much of the northeastern United States was affected by a coastal low-pressure area that strengthened into a nor'easter and brought heavy rains, snow accumulations and strong winds. Some locations in New York, Vermont, New Hampshire or Massachusetts reported snowfall in excess of 35 inches (89 cm).

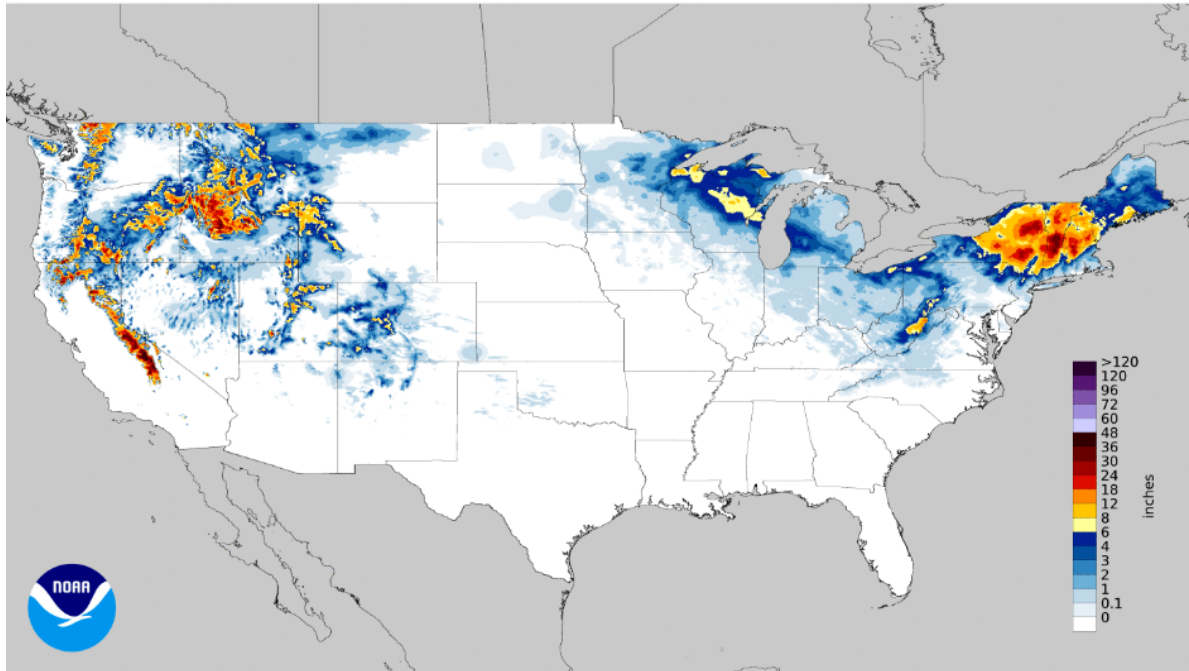


14 Mar 2023 20:56Z - NOAA/NESDIS/STAR GOES-East - GEOCOLOR Composite - Day(0.47 um - blue, 0.64 um - red, and 0.86 um - near IR)



## National Snowfall Analysis: 72-hour accumulation ending 2023-03-15 12 UTC

Issued 2023-03-17 06:59:35 UTC



### Highest snowfall accumulations in the Northeast

Location	State	Snowfall (in)
Landgrove	Vermont	40
Colrain	Massachusetts	36
Moriah	New York	36
Palenville	New York	36
Stony Creek	New York	36
Marlboro	Vermont	36
Wilmington	Vermont	36
Rowe	Massachusetts	35
Peterborough	New Hampshire	35
Readsboro	Vermont	35

### Highest rainfall in California

Location	Rainfall (in)
Honeydew	9.65
Shasta Dam	8.12
Whitehorn	7.60
Mining Ridge	6.93
Squaw Vallet	6.70
Three Peaks	6.66
Cazadero	6.33
Stirling City	5.81
Rocky Butte	5.59
Giant Forest	5.58

### Event Details

State of emergency was declared in 21 counties in California, and in 14 counties in Nevada due to flooding, landslides, and heavy snowfall. Later, on March 15, California governor extended the state of emergency to cover 43 of the state's 58 counties. The worst affected counties in California were Monterey, Merced, and Tulare. More than 380,000 customers experienced power outages, particularly in Monterey and Santa Clara County. As of March 14, the Federal Emergency Management Agency

(FEMA) reported two fatalities, more than 16,000 mandatory evacuation orders throughout northern and central California.

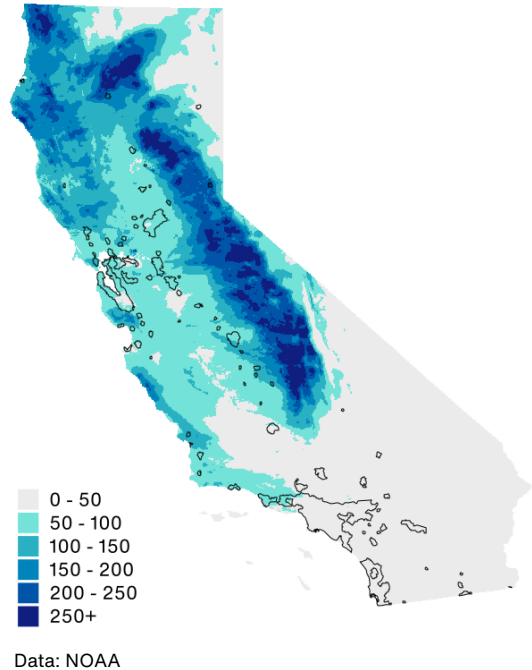
Flooding and heavy snowfall caused traffic disruptions; several roads remained closed. Additional material damage was incurred due to strong winds with gust up to 150 kph (93 mph). Heavy snow accumulated on roofs caused several buildings to collapse.

Meanwhile, north-eastern parts of the United States suffered a notable winter storm, which left more than 250,000 customers without power, about 40,000 homes in New York alone. Thousands of flights were cancelled or delayed due to storm. New Hampshire was one of the worst affected states, with several injured and more than 200 car accidents caused by wintry conditions.

### Financial Loss

Total economic and insured losses from the event were initially anticipated to reach into the tens of millions USD.

**Total Rainfall on March 9-15 (mm)**  
based on radar estimate



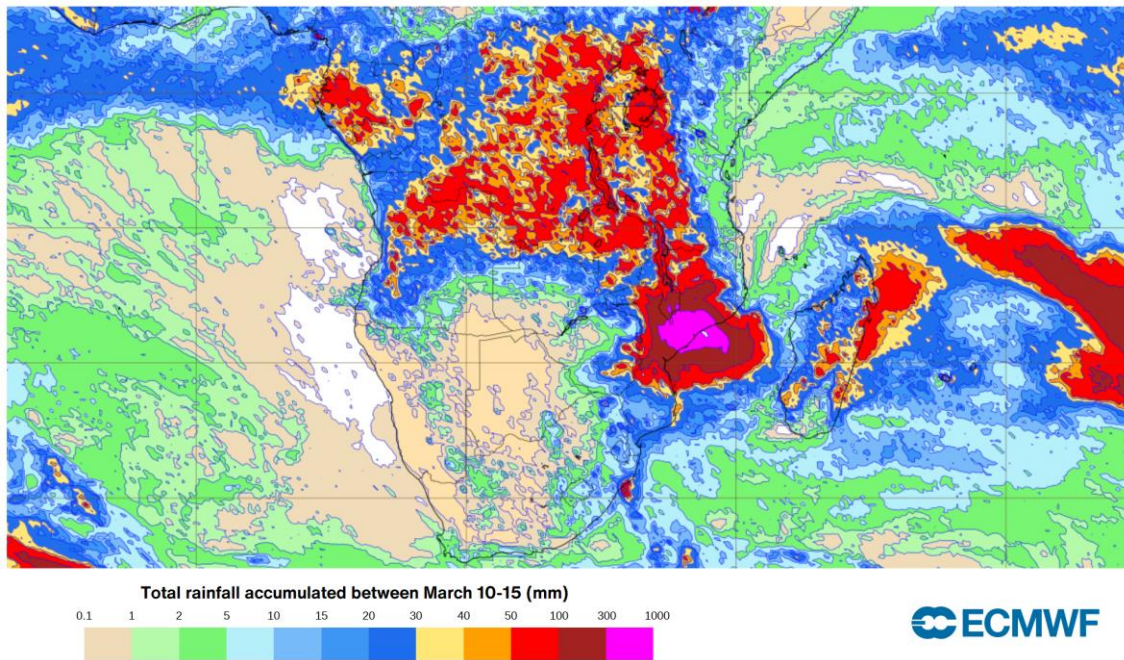
## Mozambique and Malawi: Cyclone Freddy (Update)

### Overview

While Cyclone Freddy ended its remarkable journey, death toll related to its impact continued to rise. As of this writing, disaster authorities in Malawi reported at least 225 killed and hundreds of injured due to the storm. At least 53 people were killed in Mozambique after the storm's second landfall.

### Meteorological Recap

Storm made its second landfall in the Province of Zambezia, northern Mozambique, on March 11. On March 13, the system gradually degraded and respective meteorological institutes ceased monitoring the storm as a tropical cyclone. The World Meteorological Organization (WMO) confirmed that Cyclone Freddy became the **longest-lived tropical cyclone** on record globally, with 34 days as a named tropical storm (see previous Weekly Cat Reports). As of March 15, system was dissipating and was moving as a low-pressure area between the Zambezia Province and the Mozambique Channel. Between March 11-15, storm brought strong winds and heavy rainfall exceeding 500 mm (19.7 in) locally, resulting in widespread severe flooding in Mozambique and Malawi.



### Event Details

According to the latest report of the Malawi's Department of Disaster Management Affairs (DoDMA), storm left at least 225 people dead across 12 districts of **Malawi**, particularly in Blantyre City. Almost 60,000 people were affected, more than 700 people were injured, and 41 persons remain missing, as of March 15. Total death toll rose to at least 308 fatalities – Malawi (225), Mozambique (63), Madagascar (17), Zimbabwe (2), Mauritius (1).

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## Western & Central Europe: Severe Convective Storm

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### Overview

*A series of several low-pressure systems affected Western and Central parts of Europe on March 8-13. A dynamic pattern over Europe brought strong winds and hail, notably to France. Severe weather hazards resulted in multiple injuries and property damage in several countries.*

### Meteorological Recap

Parts of Western and Central Europe were affected by multiple low-pressure areas and associated frontal systems in recent days, as a dynamic pattern with prevailing westerly flow dominated over the region. The primary hazards included strong winds, large hail, and notable, relatively rare thunderstorm activity for the month of March.

#### *March 8-11*

On March 8, France was the first impacted by severe weather, as it experienced localized winds with speeds of up to 100 kph (60 mph). The town of Montiéramey near Troyes was hit by an **EF1-tornado**. On March 9, hailstones with a diameter of up to 4 cm (1.6 in) occurred at multiple location across central and south-western France, while strong winds were reported in southern Germany.

While the event was not a typical European windstorm, a secondary low-pressure system of the main low (named Dithelm by the FU Berlin) had been designated a named storm status by Météo-France and named **Larisa**. The storm generated particularly notable wind gusts on March 10 in the south of France and notably in Corsica. The system continued to track eastward on March 11 to cause additional wind-related damage as far as Central Europe, notably in the Czech Republic, Slovakia, Hungary, and Austria, where wind gusts reached intensity of 150 kph (90 mph).

#### *March 13*

After a relatively quiet pause on March 12, storm activity ensued again on March 13. Within an unstable air mass ahead of a cold front, relatively strong thunderstorms developed during the afternoon and evening hours. The south-westerly flow induced ahead of upper trough favoured the advection of a warm air mass. A significant instability between the Pyrenees and the north-eastern France further enhanced a favourable condition for storm initiation. Prefrontal intense thunderstorm activity, notably multiple supercells, was accompanied by large hail of up to 4 cm (1.6 in) in diameter. Multicellular structures also produced strong wind gusts, reaching 110 kph (68 mph). Météo-France noted that the day was one of the stormiest March days on record.

### Event Details

Among the worst affected by severe weather between March 8-13 was **France**. Several vehicles and about 30 homes sustained damage after EF1-tornado hit the town of Montiéramey, central France, on March 8. Additional wind-related damage was incurred on March 9-10, along with at least five injured people, according to the European Severe Weather Database (ESWD). On March 13, fire brigades carried out hundreds of interventions, at least four people sustained injuries due to wind.

Rather minor damage was incurred across **Germany** during the severe weather period. Central Europe, including **Austria, Czech Republic, Slovakia,** and **Hungary**, was particularly affected by low Larisa on March 11. In the Czech Republic, at least 22 people were injured in wind-related accidents. In Austria, fire brigades intervened more than 200 times across Lower Austria, Upper Austria, and capital Vienna, mostly due to fallen trees, one person was injured.

The dynamic weather pattern also brought wintry conditions to parts of **United Kingdom**, as blizzard conditions caused widespread travel disruption and the closure of hundreds of schools.

### **Financial Loss**

Total aggregated impacts from recent storms from both economic and insured loss perspectives were initially expected to reach into the tens of millions EUR.



## Natural Catastrophes: In Brief

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### **Flooding (Peru)**

The National Meteorology and Hydrology Service of Peru (SENAMHI) has monitored “unusual unorganized tropical cyclone” since March 7. This system brought heavy rainfall on March 8-11, triggering severe flooding, particularly in the regions of Tumbes, Piura, Cajamarca, Lambayeque, La Libertad, and Ancas. As of this writing, at least six people died, and thousands were affected. More than 2,000 homes were damaged due to flooding, according to disasters authorities (INDECI). INDECI reported no fewer than 58 fatalities, 57 injured, and 8 missing people due to flooding and landslides since the beginning of the rainy season, along with material damage on almost 3,000 homes.

### **Flooding (Australia)**

Multiple rivers in Northern Queensland, Australia, retained major flooding level during March 9-13 after heavy rainfall affected the region. Some residents were forced to leave their homes, particularly in Gregory Downs and Burketown, where tens of buildings were inundated. On March 12, severe thunderstorms brought heavy rain, large hail and damaging winds in Brisbane and Gold Coast area, south-eastern Queensland.

### **Flooding & Landslide (Indonesia)**

Heavy rains since March 9 killed at least three people and caused minor damage in provinces of South Sumatra and Lampung, Indonesia. More than 18,000 people across several regencies were affected. Meanwhile, the death toll from massive landslide in Serasan District on March 6 (see previous Weekly Cat Report) rose to 46 fatalities and nine people remain missing, according to authorities.

### **Landslide (Brazil)**

At least eight people died in a landslide in Manaus, northern Brazil, after heavy rains hit the area on March 12. Authorities reported that 84 families were rendered homeless in 20 homes that were damaged by the event.

### **Flooding (Colombia)**

Torrential rainfall caused flooding in Cesar Department, northern Colombia, on March 8-11. Local infrastructure and more than 600 homes suffered damage, about 700 hectares (1,700 acres) were affected by flood waters, according to the Colombia’s National Unit for Disaster Risk Management (UNGRD).

### **Severe Convective Storm (Thailand)**

Severe storms resulted in wind and flood-related damage in several northern and central provinces of Thailand, including the Bangkok area on March 12-14. According to the Department of Disaster Prevention and Mitigation, nearly 650 homes were damaged and several thousands of people were affected in total.

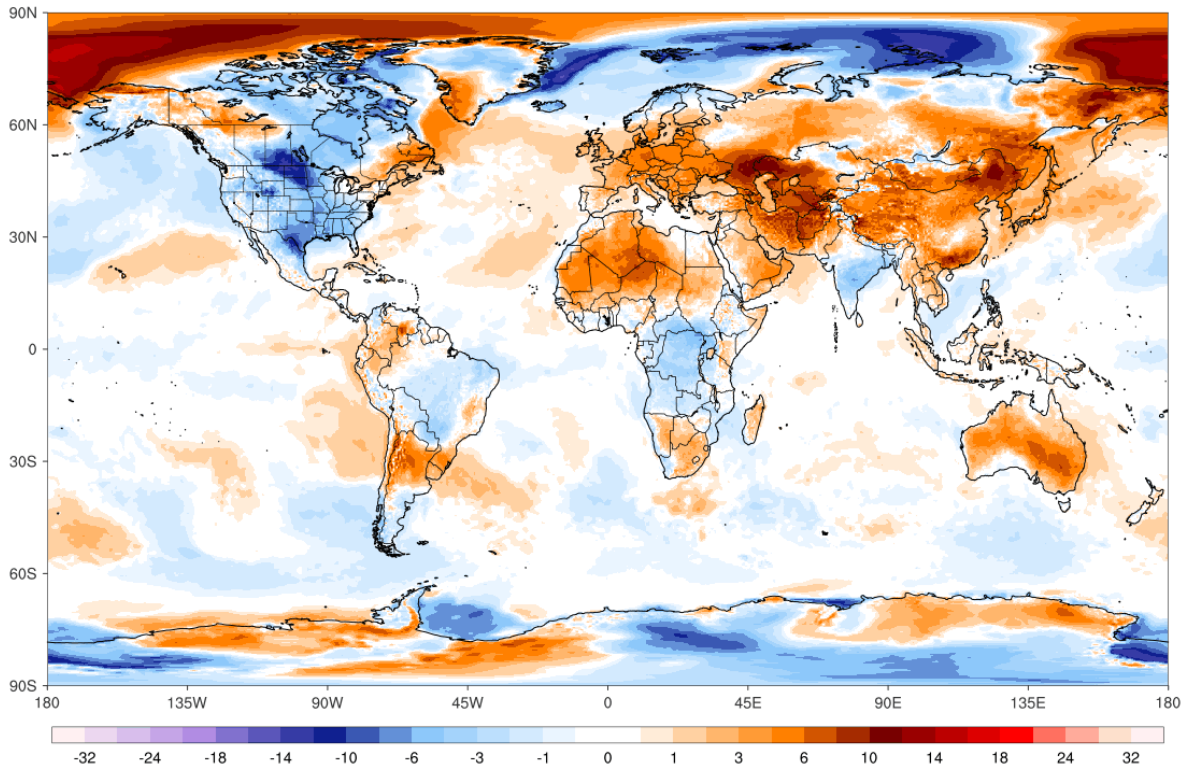
## **Flooding (Turkey)**

Intense rainfall that fell in the Adiyaman and Sanliurfa Provinces of southeastern Turkey on March 15 resulted in deadly flash flooding. According to the Disaster and Emergency Management Presidency (AFAD), 136 millimeters (5.4 inches) of rain was recorded in Tut District of Adiyaman. Authorities confirmed 17 fatalities in Sanliurfa (15) and Adiyaman (2) and nearly 70 injuries, eight of the fatalities were reported from the Abide Junction underpass in Sanliurfa. Preliminary assessments revealed that roughly 2,000 residential and commercial properties were flooded or damaged. The event occurred in the region severely affected by the earthquake sequence that started on February 6.

## Global Temperature Anomaly Forecast

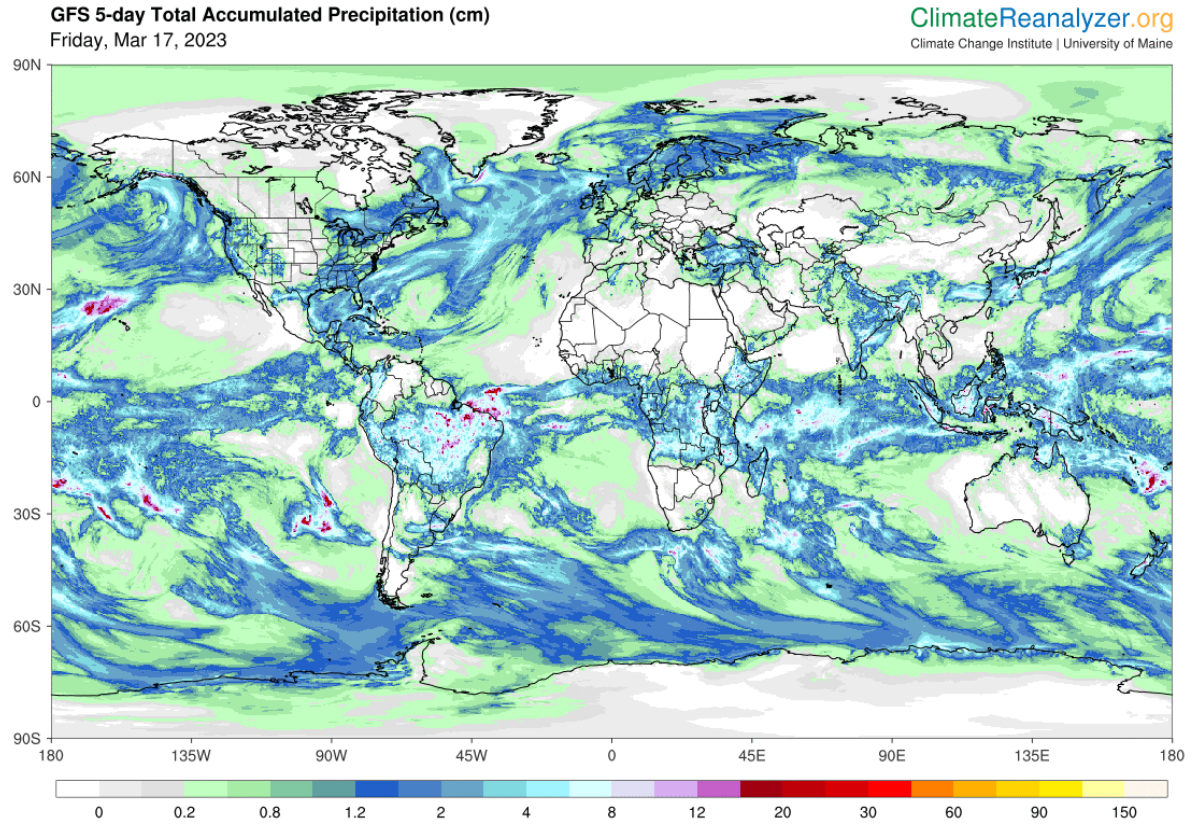
GFS/CFSR 5-day Avg 2m T Anomaly (°C) [1979-2000 base]  
Friday, Mar 17, 2023

ClimateReanalyzer.org  
Climate Change Institute | University of Maine



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

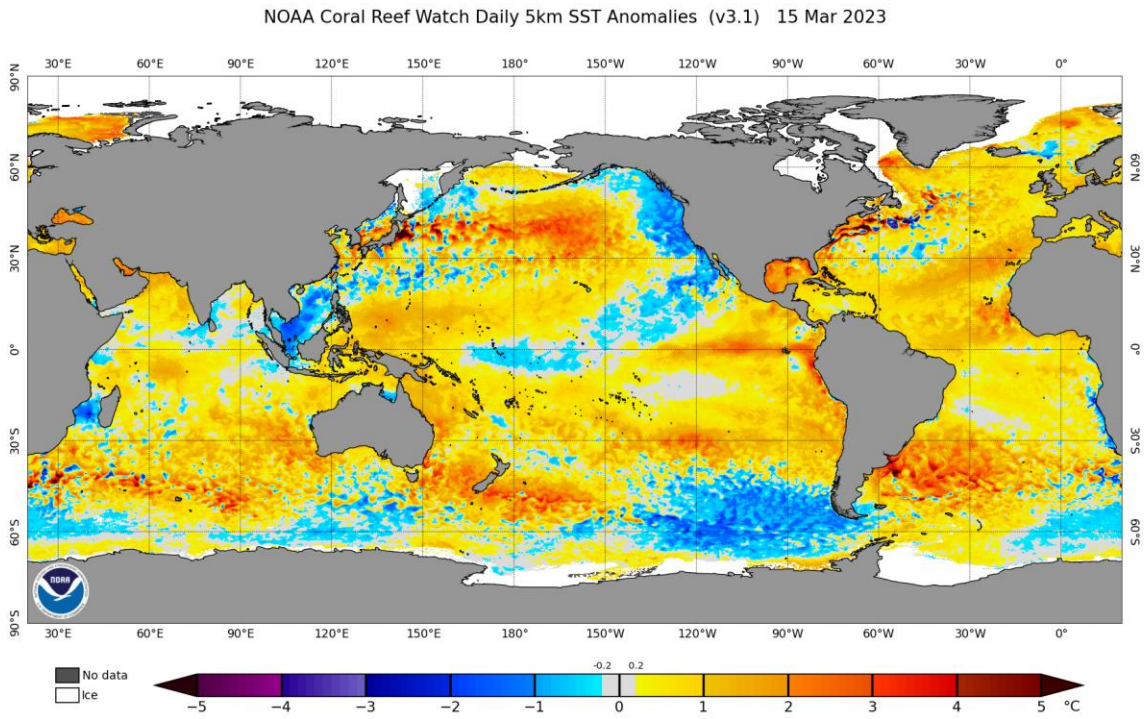
# Global Precipitation Forecast



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



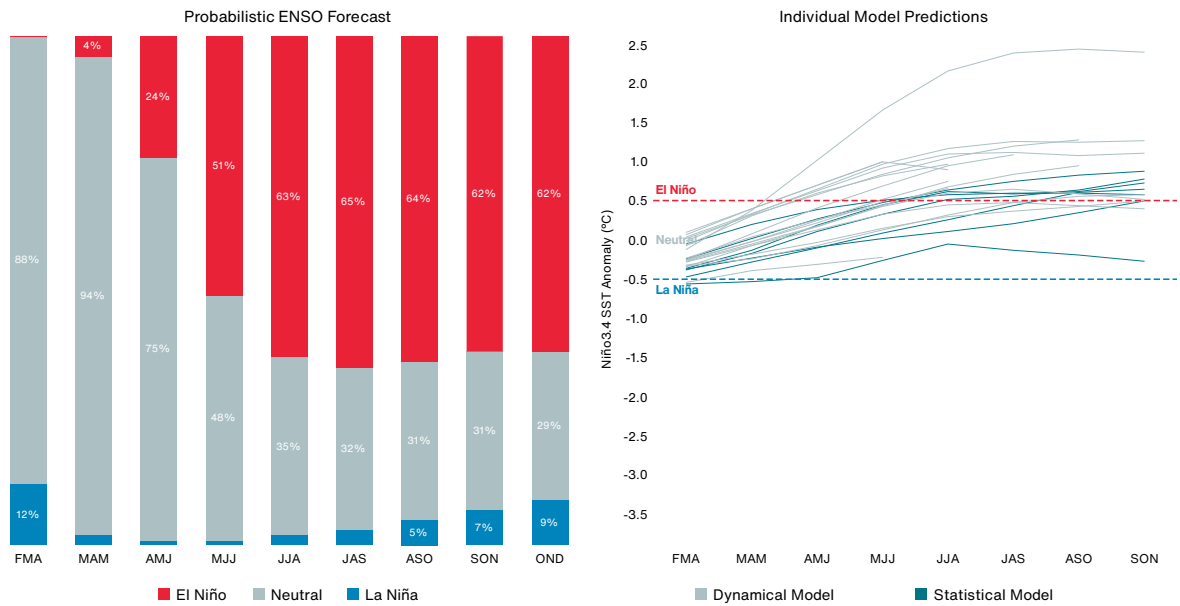
## Weekly Sea Surface Temperature (SST) Maps (°C)



## El Niño-Southern Oscillation (ENSO)

### Probabilistic ENSO Model Projections: February 2023

Data: NOAA & Columbia University (IRI) | Graphic: Catastrophe Insight, Aon



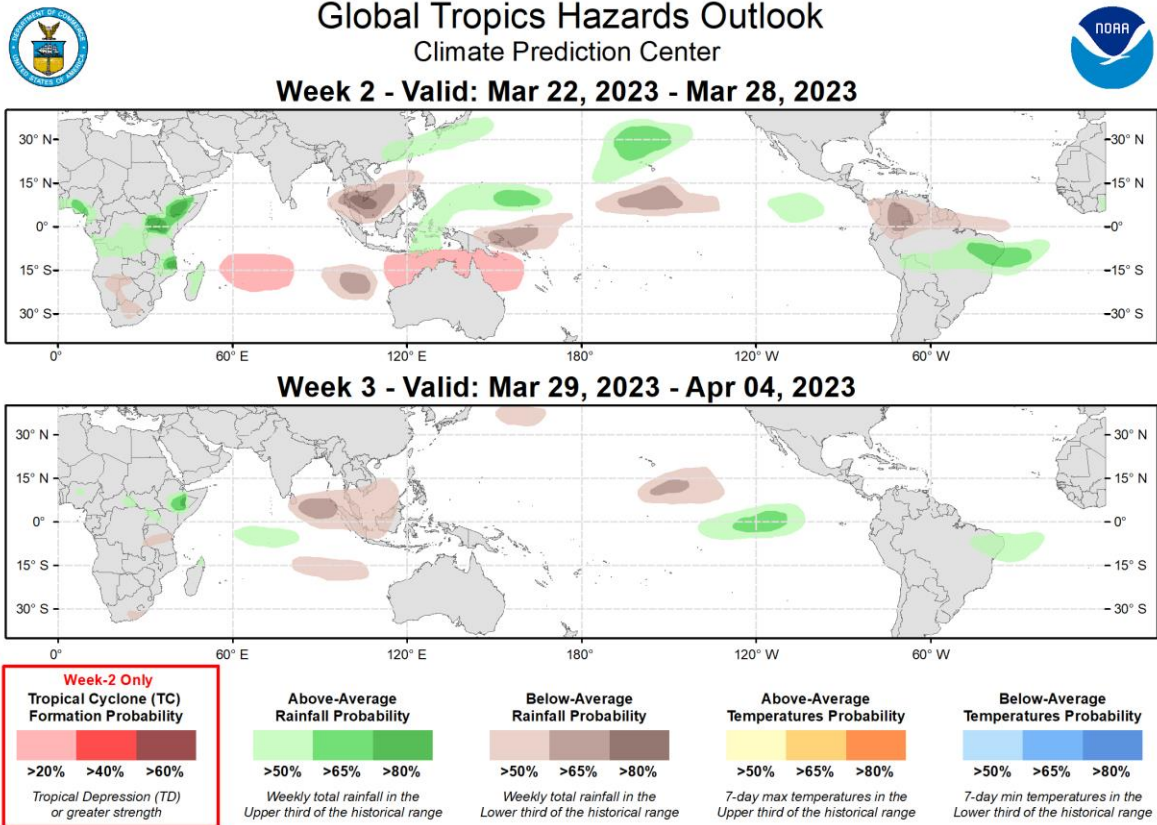
**El Niño:** Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.

**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



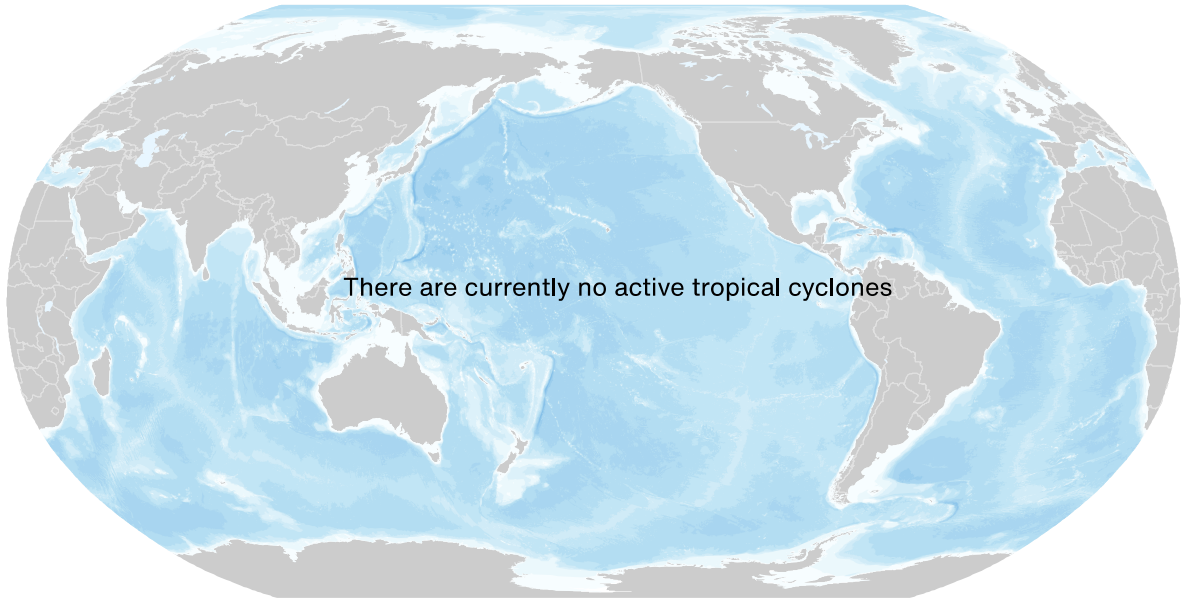
**Issued: 03/14/2023**

**Forecaster: Barandiaran**

This product is updated once per week and targets broad scale conditions integrated over a 7-day period for US interests only. Consult your local responsible forecast agency.

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

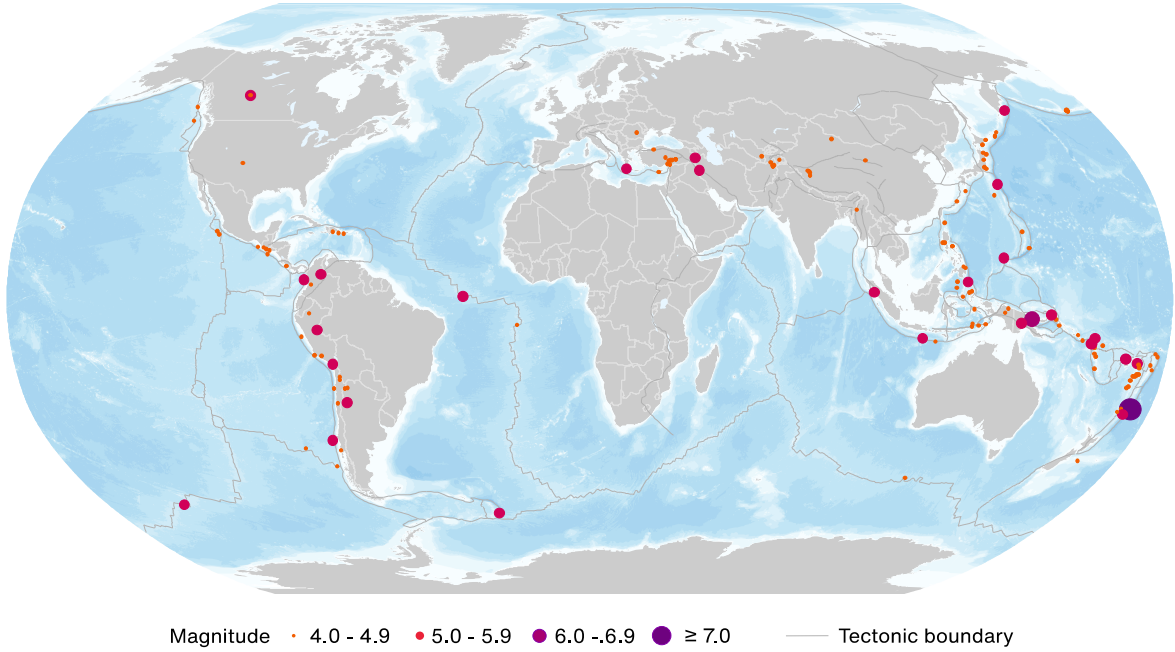
\* TD: Tropical Depression, TS: Tropical Storm, HU: Hurricane, TY: Typhoon, CY: Cyclone

\*\* 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)



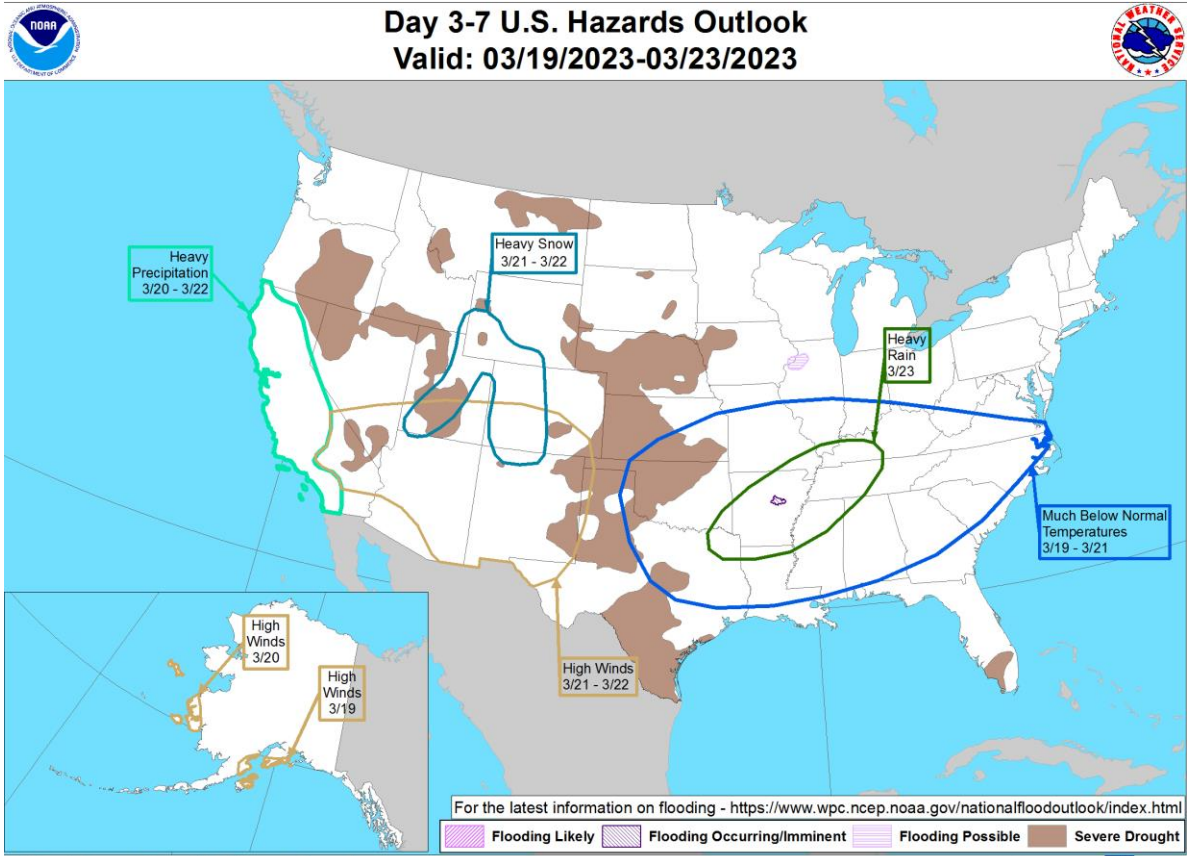
## Global Earthquake Activity ( $\geq M4.0$ ): Mar 10-16



Date (UTC)	Location	Magnitude	Epicenter
3/14/2023	5.41S, 146.85E	6.3	eastern New Guinea region, Papua New Guinea
3/16/2023	30.11S, 176.11W	7	Kermadec Islands region

Source: United States Geological Survey

## U.S. Hazard Outlook



**Weather Prediction Center**

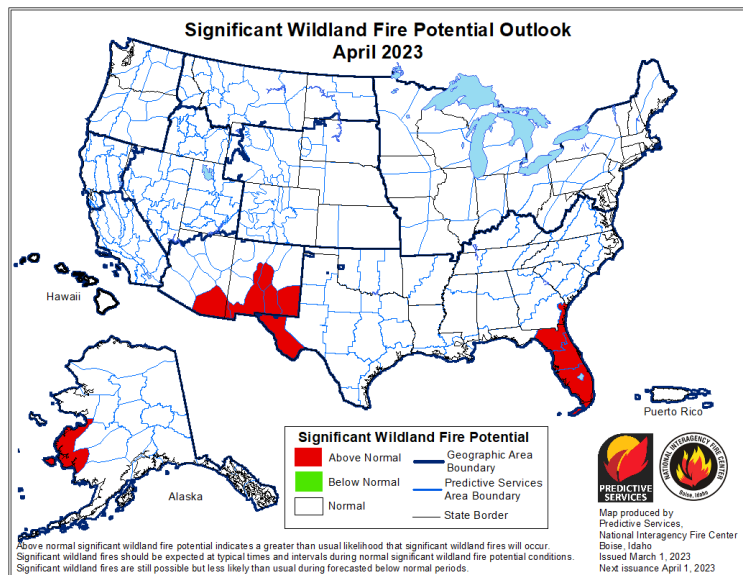
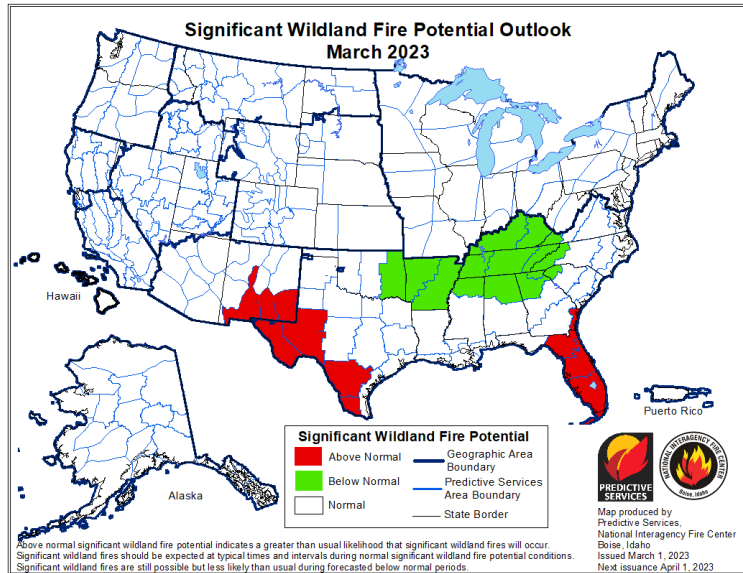
Made: 03/16/2023 3PM EDT

Source: Climate Prediction Center (NOAA)

Follow us: 

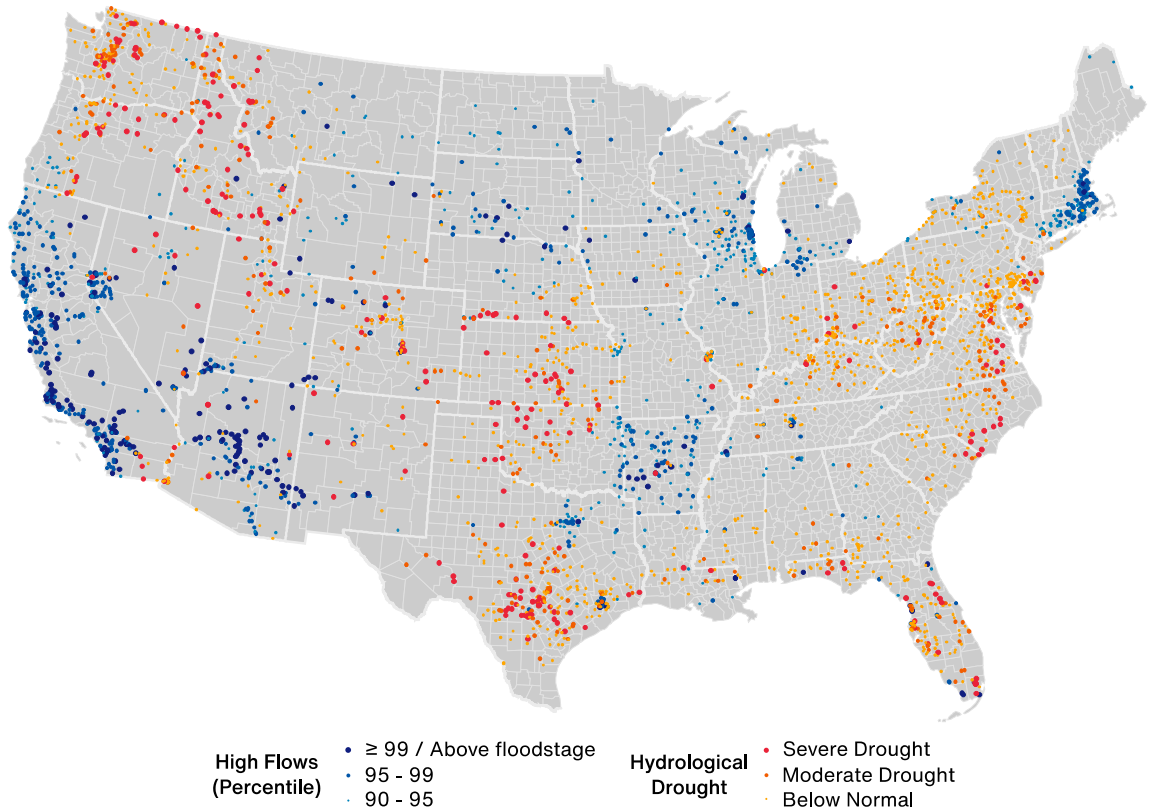
[www.wpc.ncep.noaa.gov](http://www.wpc.ncep.noaa.gov)

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



Source: NIFC

## U.S. Current Riverine Flood Risk



*A  $\geq 99^{\text{th}}$  percentile indicates that estimated streamflow is greater than the 99<sup>th</sup> percentile for all days of the year. This methodology also applies for the other two categories. A stream in a state of severe drought has 7-day average streamflow of less than or equal to the 5<sup>th</sup> percentile for this day of the year. Moderate drought indicates that estimated 7-day streamflow is between the 6<sup>th</sup> and 9<sup>th</sup> percentile for this day of the year and 'below normal' state is between 10<sup>th</sup> and 24<sup>th</sup> percentile.*

Source: United States Geological Survey



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## Source Information

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### **United States: Flooding & Winter Weather**

The Federal Emergency Management Agency (FEMA)

Nearly 200,000 customers without power in the Northeast as strong winds from a departing nor'easter linger in the region. CNN

Weather Prediction Center

National Weather Service

NOAA

### **Western & Central Europe: Severe Convective Storm**

European Severe Weather Database (ESWD)

Tornado Wednesday evening: major damage in Montiéramey and the surrounding villages, *L'Est éclairé*  
Météo-France

### **Mozambique and Malawi: Cyclone Freddy (Update)**

The World Meteorological Organization (WMO)

The European Centre for Medium-Range Weather Forecasts (ECMWF)

Malawi's Department of Disaster Management Affairs (DoDMA)

Malawi, Mozambique race to rescue survivors as cyclone toll rises above 270, *Reuters*

### **Natural Catastrophes: In Brief**

The National Meteorology and Hydrology Service of Peru (SENAMHI)

The National Institute of Civil Defense of Peru (INDECI)

The National Agency for Disaster Countermeasure of Indonesia (BNPB)

The Colombia's National Unit for Disaster Risk Management (UNGRD)

ASEAN Disaster Information Network

Cyclone in Peru causes major flooding, at least six dead, *Reuters*

Queensland floods: Burketown residents warned of crocodile-infested waters ahead of expected peak, *The Guardian*

Malawi Red Cross Society

8 Killed, Homes Destroyed After Landslide in Manaus, Amazonas, *Floodlist*

DDMA, Thailand

Flood disaster in the earthquake region: 17 people lost their lives in Şanlıurfa and Adiyaman, BBC

AFAD, Turkey

## Contacts

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## About Aon

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