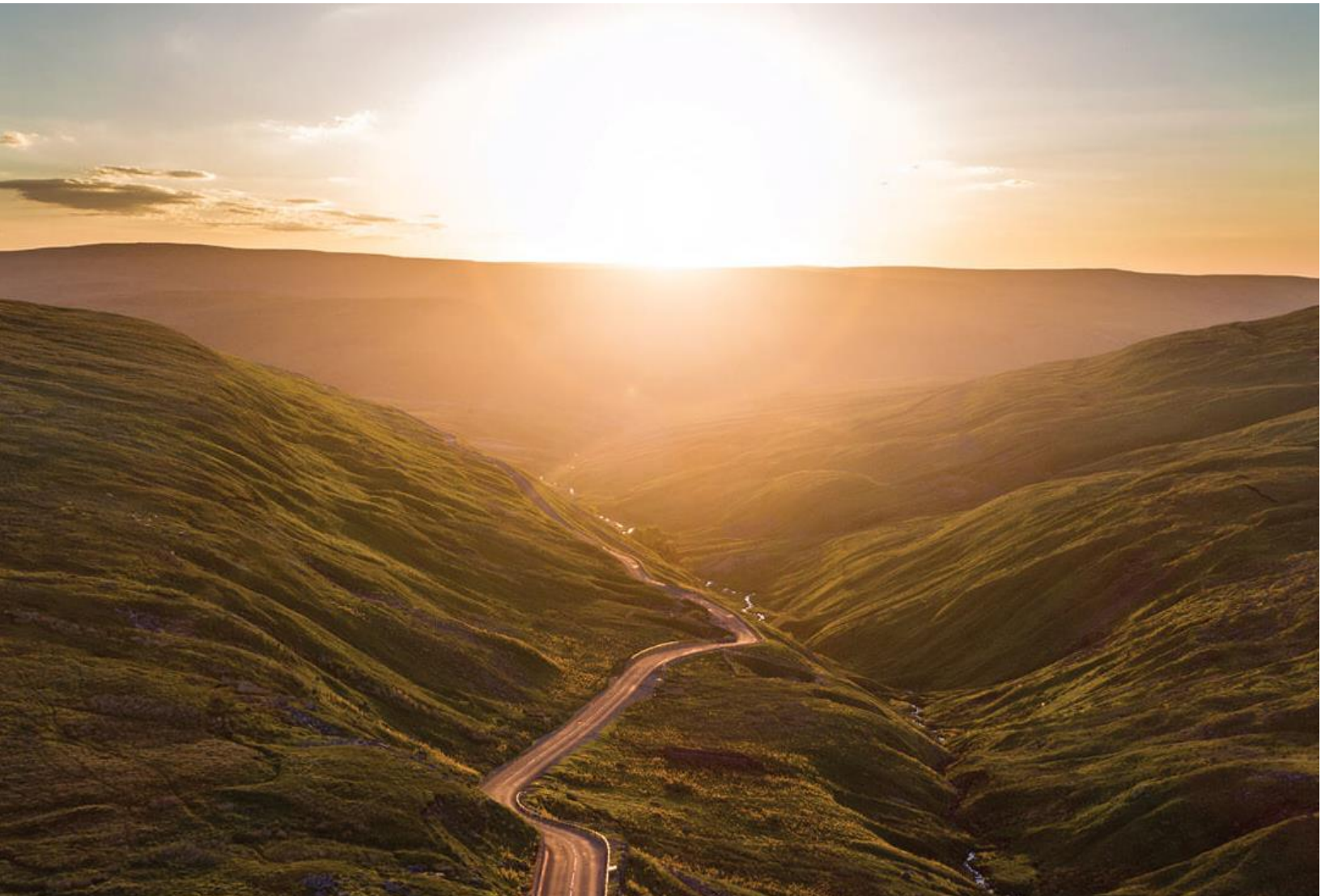
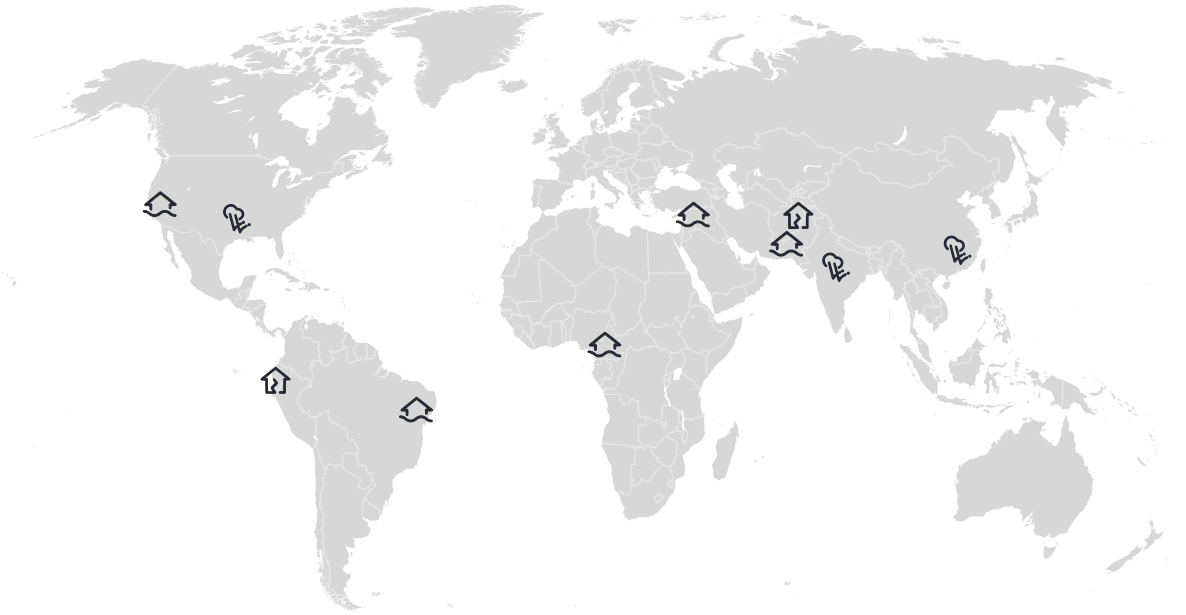
Weekly Cat Report

March 24, 2023



Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss ($)	Page
Flooding	United States	5	10s of millions	3
Severe Convective Storm	United States	0	10s of millions	3
Earthquake	Ecuador, Peru	18+	10s of millions	5
Severe Convective Storm	India	16+	Millions	7
Flooding	Syria	8+	Unknown	7
Flooding & Landslide	Brazil	6+	Unknown	7
Flooding	Cameroon	2+	Unknown	7
Earthquake	Afghanistan, Pakistan	13+	Millions	7
Flooding	Pakistan	10	Unknown	7
Severe Convective Storm	China	0	5+ million	8

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

United States: Flooding & Severe Convective Storm

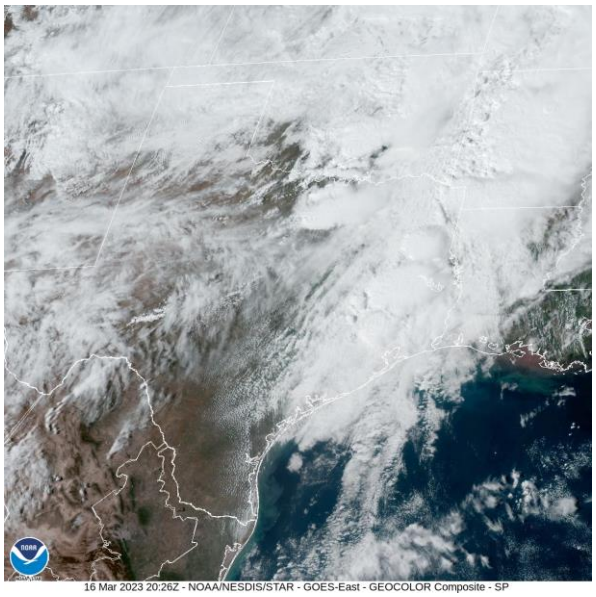
Overview

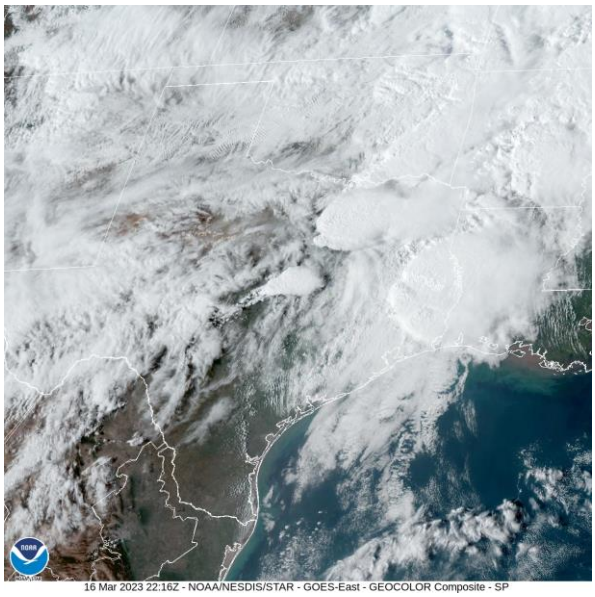
Renewed flooding in parts of California on March 21-23 resulted in additional five deaths and material damage. The state has already endured multiple rounds of heavy precipitation, flooding and landslides this year, with total economic losses running into the billions of USD. Separately, severe storms resulted in notable insured losses in Texas and Oklahoma on March 16-17.

Meteorological Recap

March 16-17

Large hail and strong winds impacted parts of northeastern Texas and southern Oklahoma on March 16-17, as a fast-moving cold front moved through the area and storms initiated in a favorable environment of high instability and strong vertical wind shear. The Storm Prediction Center (SPC) noted very large hail with a diameter of 4 inch (10 cm) in La Salle County, while hailstones with sizes ranging from 1 to 2 inch (2.5 – 5 cm) were widespread.

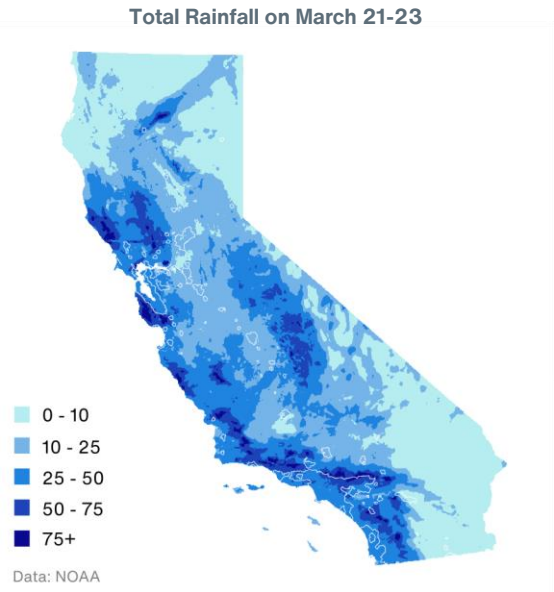


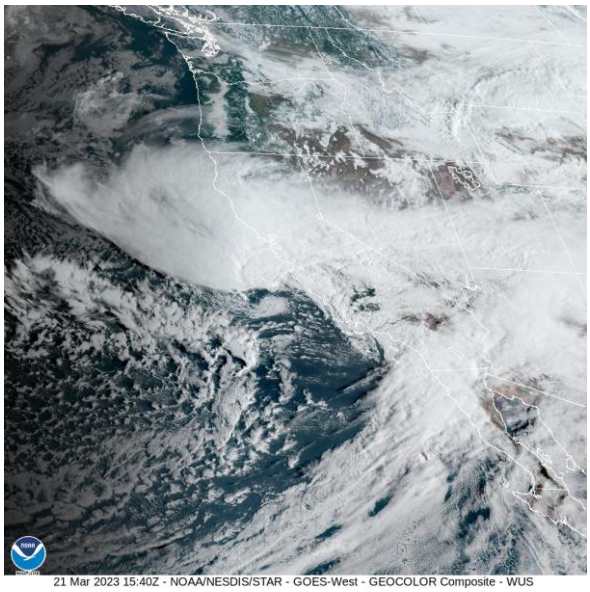


March 21-23

The series of storms that have affected the West Coast of the United States this year continued with another bout of excessive rain on March 21-23, as another atmospheric river, already 12th this season, brought additional moisture. Hazards in lower elevation under about 5,000 ft (1,500 m) were mainly associated with new rainfall accumulations, but also other factors such as melting snowpack, as well as previous saturation of soils in the region. Precipitation was particularly intense in the coastal areas. These factors have continued to generate prolonged flooding.

The event additionally brought strong winds, convective weather and also added to an already deep snowpack at higher elevations of Sierra Nevada, particularly above the elevation of approximately 8,000 ft (2,400 m).





Event Details

Primary impacts from the severe convective storm event on **March 16-17** were associated with large hail, with additional damage caused by strong winds. Particularly noteworthy was the large hail that hit the densely populated Dallas-Fort Worth metro area.

Renewed flooding across central and southern California on **March 21-23** resulted in at least five fatalities. Thousands of people had to be evacuated from two towns in central California in Tulare County, Alpaugh and Allensworth, where multiple breaches in waterways occurred. Multiple structures have been destroyed and more than 680 have been damaged by flooding in Tulare County alone. Large swaths of agricultural land in the state were under water.

Additionally, a tornado hit Montebello in Los Angeles metro area and resulted in notable damage on commercial property. More than 700,000 power outages were registered throughout the state, and further disruption occurred due to hundreds of delayed or cancelled flights

Financial Loss

The recent bout of precipitation and convective weather was expected to add a notable economic and insured loss to an already high seasonal total. Losses from the last event were anticipated to reach at least into the tens of millions USD.

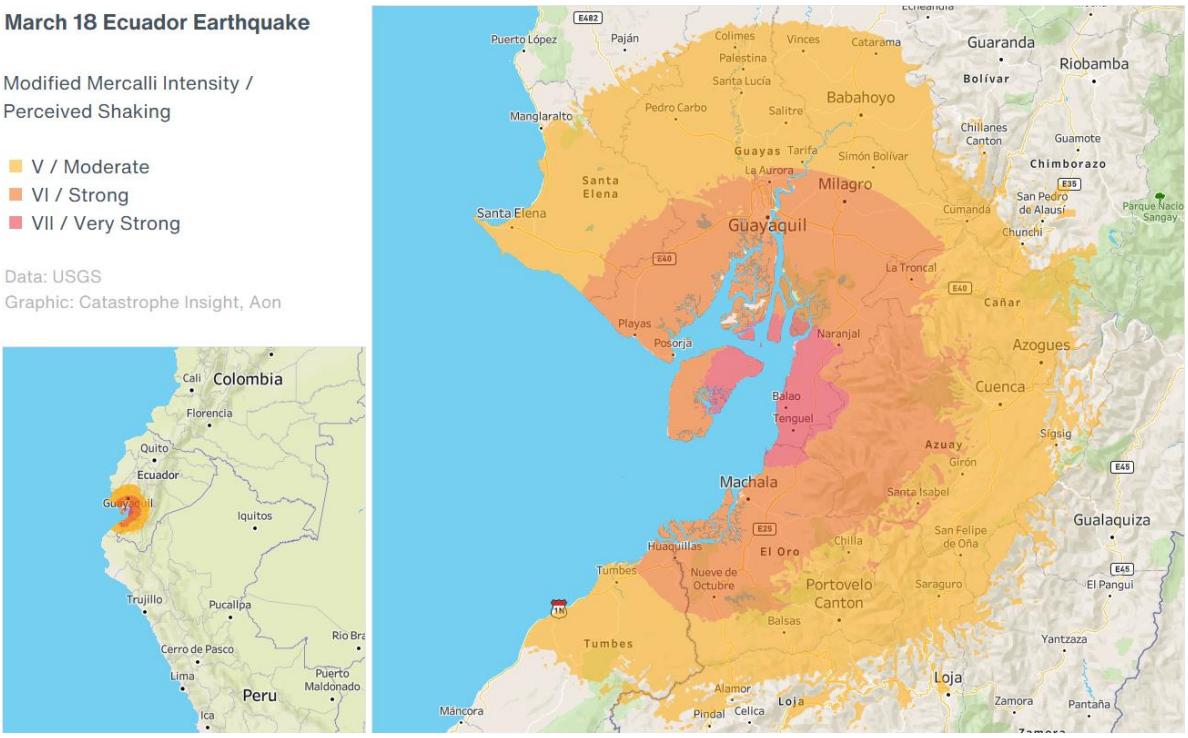
Ecuador and Peru: Earthquake

Overview

A strong, magnitude-6.8 earthquake jolted several provinces in Ecuador and Peru on March 18, resulting in casualties and material damage. As of this writing, tremors killed no fewer than 18 people, injured hundreds of others, and damaged dozens of buildings throughout the region. Initial economic losses were estimated to be in the tens of millions USD.

Seismological Recap

On March 18, a strong earthquake with a magnitude of 6.8 and with a depth of 65.8 km (40.9 mi) struck southern Ecuador. The epicentre was located in the Gulf of Guayaquil, approximately 80 km (49.7 mi) south of Guayaquil City. It reached a maximum intensity of VII (*very strong shaking*) on Modified Mercalli Intensity (MMI) scale. According to the U.S. Geological Survey (USGS), earthquake occurred as the result of oblique faulting near the subduction interface of the Nazca and South America plates. The faulting mechanism and depth suggest that event may have occurred within the subducted lithosphere of the Nazca plate. At the location of the earthquake, the Nazca plate moves to the east relative to the South America plate at a velocity of about 73 mm (2.87 in) per year.



Strong earthquakes are common in this region of Ecuador. In the past century, 32 earthquakes exceeded magnitude of 6.0 within the area of 250 km (155 mi) from the latest March 18 event. One of the strongest, magnitude-7.8 earthquake, jolted the region on April 16, 2016, left almost 700 dead and about 28,000 injured. The event caused material damage on more than 40,000 buildings, generating total economic losses of $4 billion (inflated).

Event Details

According to the USGS, almost 5 million people were exposed to the strong shaking (VI on MMI scale), more than 760,000 people felt very strong shaking (VII on MMI scale).

The earthquake was felt in 13 of 24 provinces in **Ecuador**. According to the Risk Management Secretariat of Ecuador (SGR), at least 16 people were killed across the most affected provinces of El Oro (12), Azuay (2), and Guayas (2). In total, 494 people were injured across the country. Notable material losses were incurred, which included at least 732 structures damaged, at least 102 completely destroyed, along with damage to several bridges and local infrastructure. Many cities experienced power outages.

Earthquake damage in Cuenca, Azuay Province
Source: The Risk Management Secretariat of Ecuador

As of March 21, the National Institute of Civil Defense of **Peru** (INDECI) reported two dead and several injured. More than 50 houses were destroyed across three provinces, particularly in Tumbes province.

Financial Loss

Damage assessments throughout the affected region are still ongoing. The earthquake had a 33 percent likelihood of incurring economic losses in the tens millions of USD, based on the USGS's PAGER methodology.

Natural Catastrophes: In Brief

Severe Convective Storm (India)

Several cities, particularly across Madhya Pradesh State in central India, have been affected by severe thunderstorms associated with large hail, strong winds and heavy rainfall since March 17. According to local media and disaster authorities, at least 16 people died and 14 were injured in severe weather-related incidents, mainly due to strong winds and lightning, which also caused additional material damage on property and infrastructure.

Flooding (Syria)

Torrential rain and subsequent flooding left at least 8 people dead in several cities in northern Syria, particularly in Al Hasakah, Ar-Raqqa, and Kobane, on March 16. Floods destroyed several bridges, caused infrastructural and agricultural damage and inundated several sheltering camps for earthquake victims.

Flooding & Landslide (Brazil)

Several municipalities across the states of Ceará and Maranhão, northeastern Brazil, declared state of emergency due to flooding and landslides that have affected the region since March 16. Additional damage was reported from Para, Pernambuco and Piau. As of this writing, at least 6 people were killed, dozens of people were forced to leave their homes, tens of houses were damaged, according to authorities.

Flooding (Cameroon)

City of Buea, south-western Cameroon, was badly affected by severe flash flooding and landslides after heavy rainfall that hit the region on March 18-19. Notable infrastructural losses and damage on dozens of homes and vehicles were incurred. Media reported two fatalities five others injured, and several missing.

Earthquake (Afghanistan, Pakistan)

At least 13 people were killed as a result of a strong, magnitude-6.5 earthquake that struck in the Hindu Kush Mountain range in northeastern Afghanistan, with strong shaking also registered in northern Pakistan. Afghan authorities reported 4 fatalities and 70 injured, while the Provincial Disaster Management Authority of Khyber Pakhtunkhwa Province in Pakistan confirmed 9 fatalities and 44 injured. Hundreds of homes were damaged.

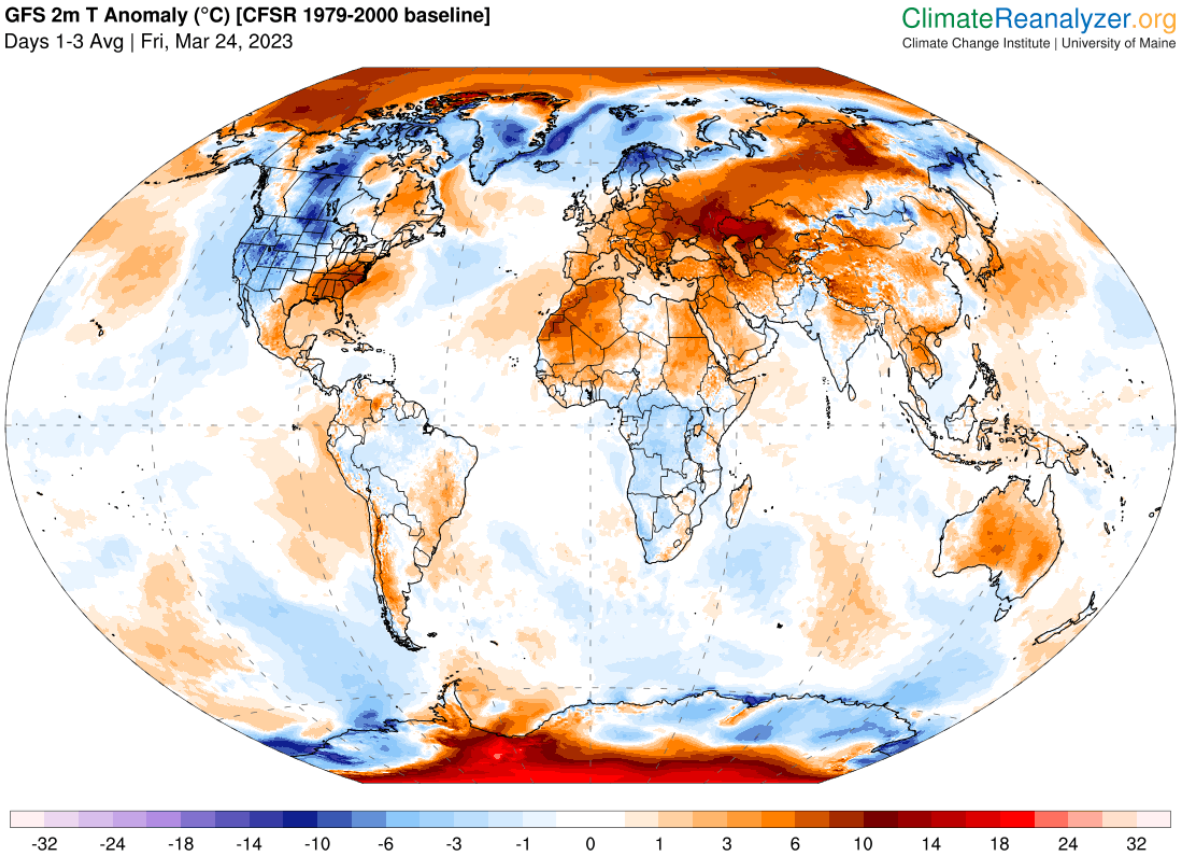
Flooding (Pakistan)

Heavy rainfall in the Balochistan Province of southwestern Pakistan since March 17 resulted in notable flooding with at least 10 fatalities. Among the worst affected was the Awaran district.

Severe Convective Storm (China)

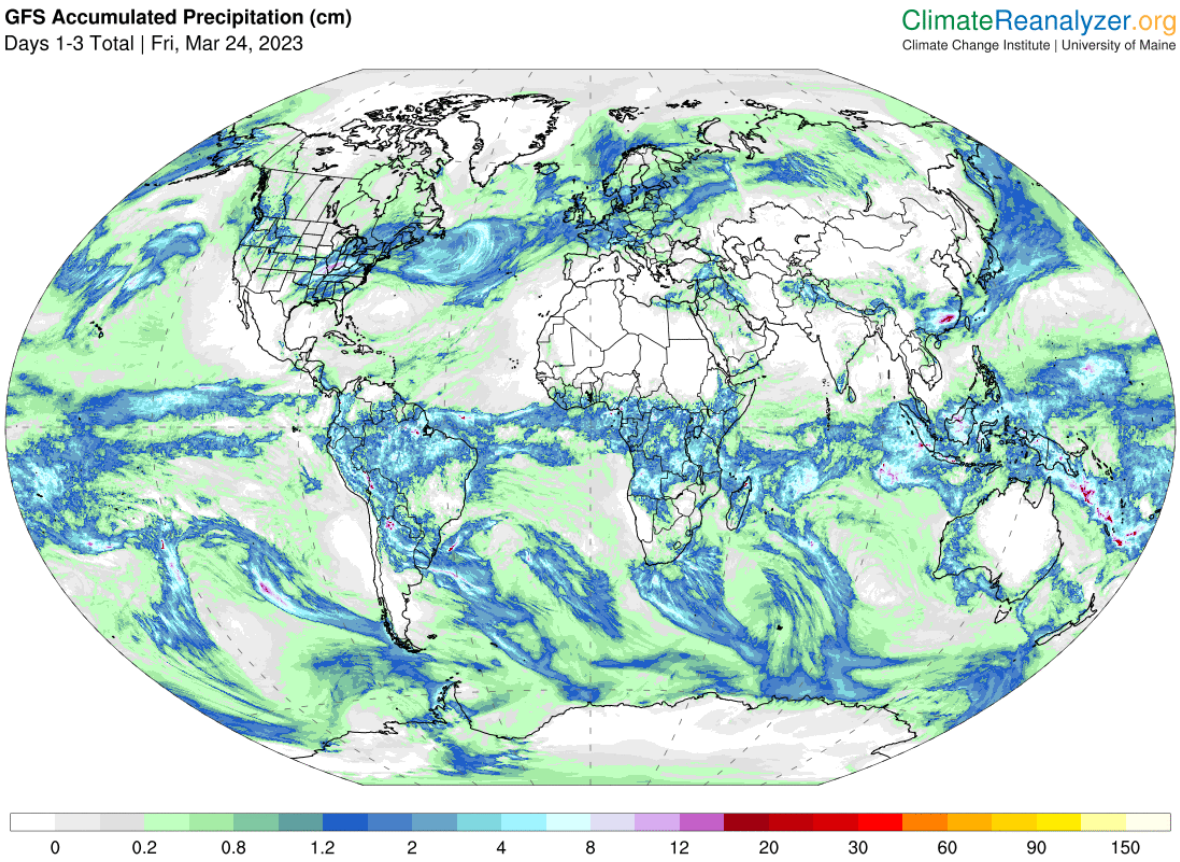
Notable hailstorms affected parts of the southeastern Chinese province of Jiangxi on March 21-23, causing property and agricultural damage. According to local authorities, nearly 2,000 homes were damaged and economic losses reached at least ¥36 million ($5 million).

Global Temperature Anomaly Forecast



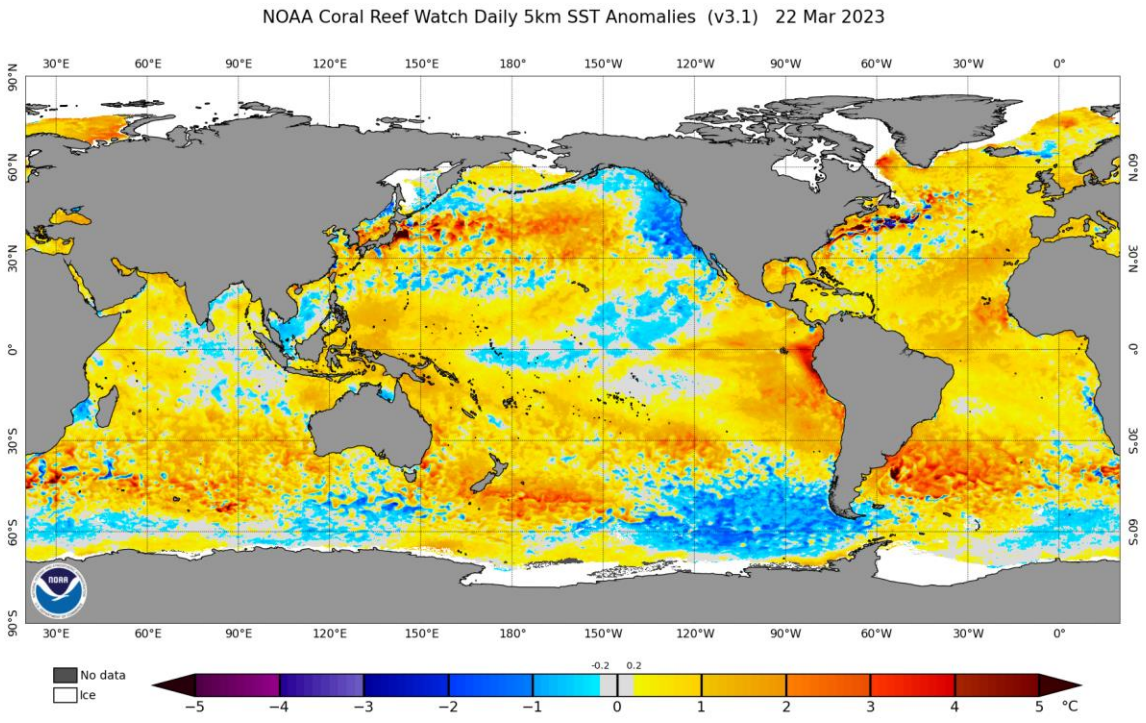
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Forecast

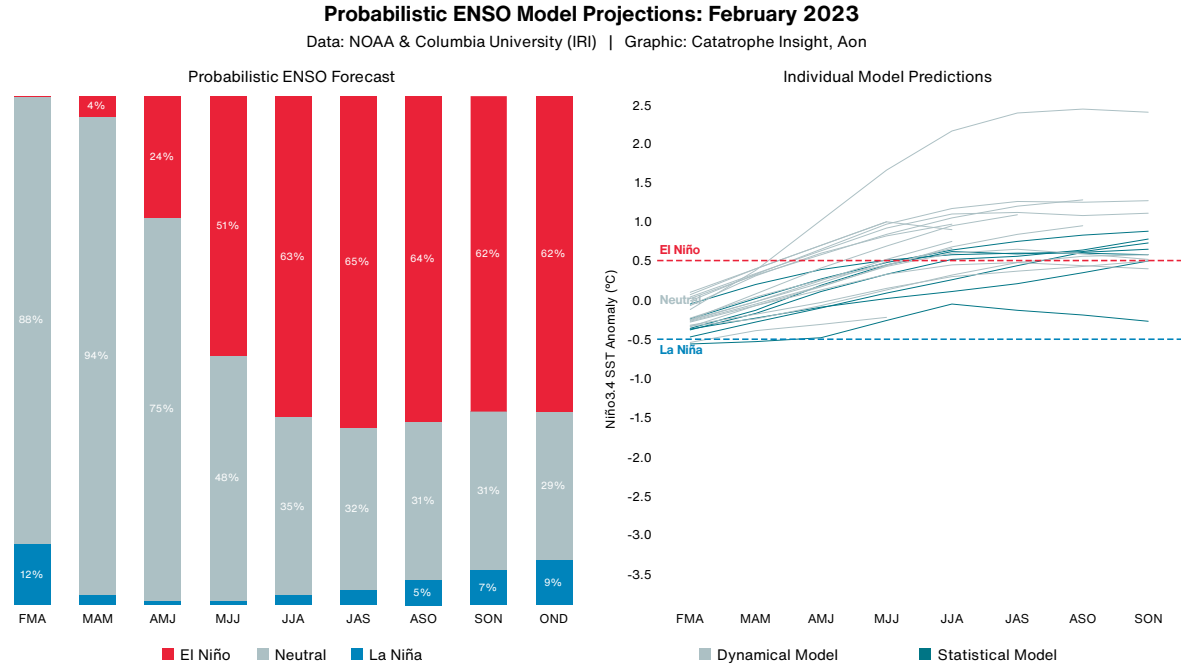


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

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



El Niño-Southern Oscillation (ENSO)



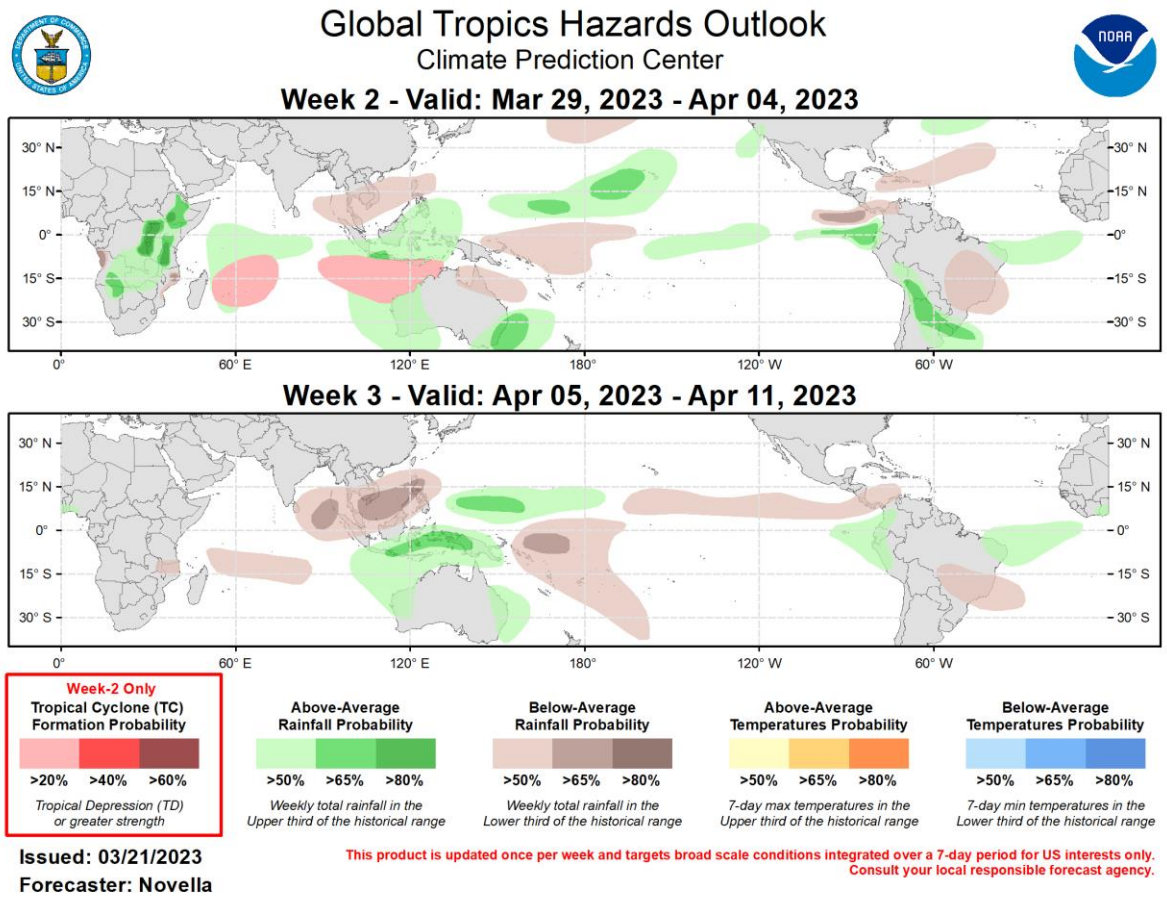
El Niño: *Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.*

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.*

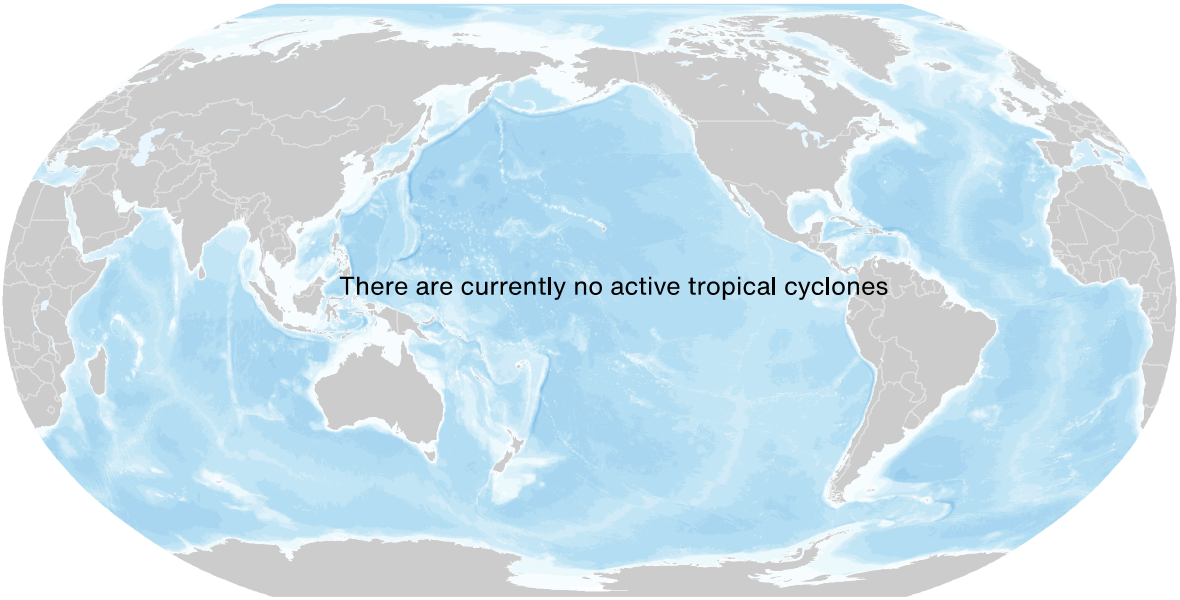
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

Global Tropics Outlook



Source: Climate Prediction Center (NOAA)

Current Tropical Cyclone Activity



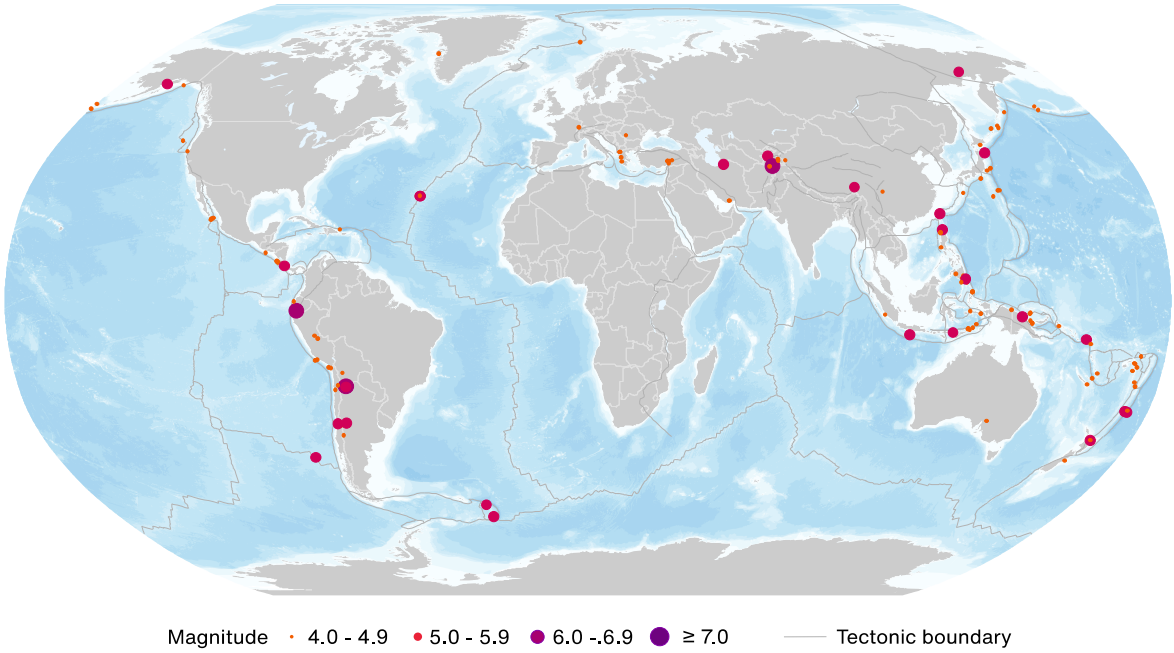
Tropical Depression Tropical Storm Category 1 Category 2 Category 3 Category 4 Category 5

Storm Name	Location	Winds	Location from Nearest Land Area

* 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)

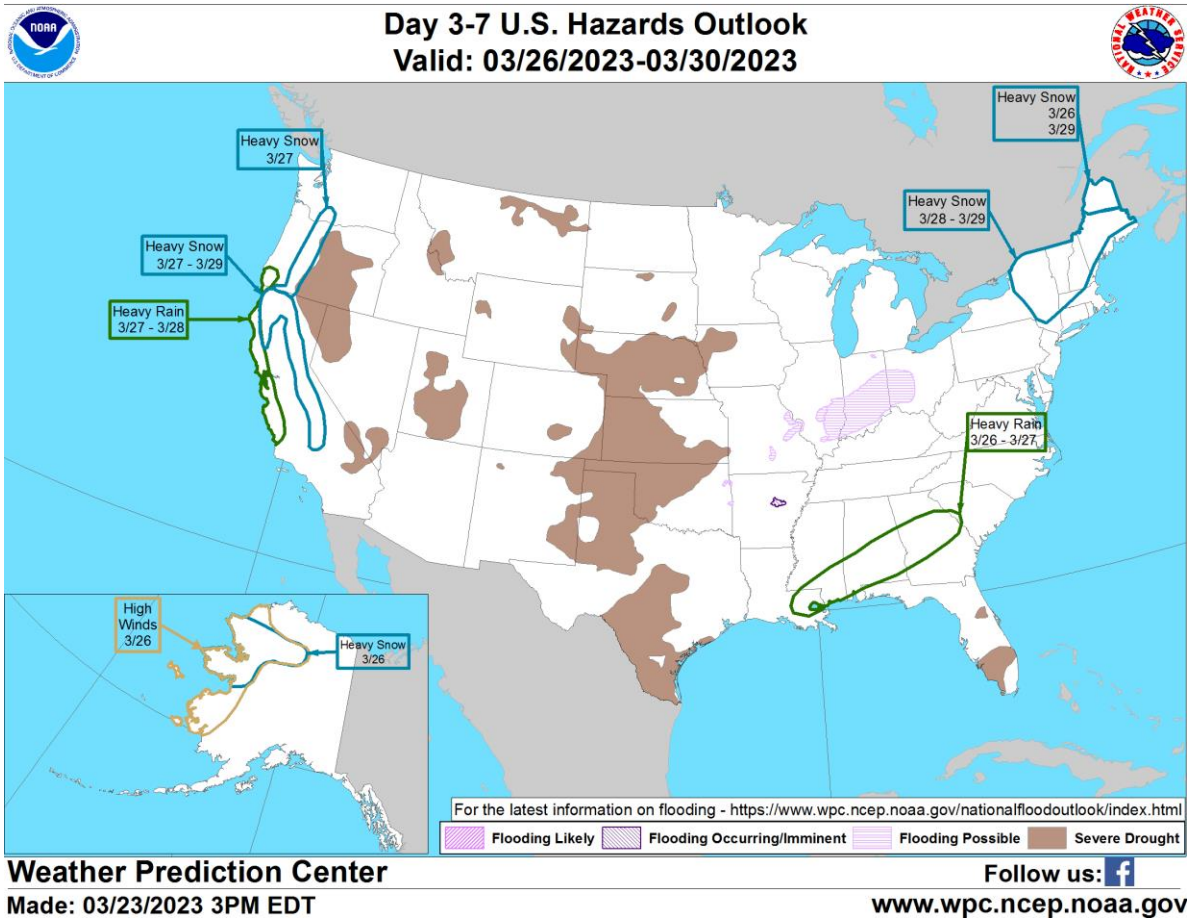
Global Earthquake Activity (≥M4.0): Mar 17-23



Date (UTC)	Location	Magnitude	Epicenter
3/18/2023	2.84S, 79.84W	6.8	8 km (5 miles) NNW of BalÃ¡o, Ecuador
3/21/2023	36.52N, 70.98E	6.5	40 km (25 miles) SSE of Jurm, Afghanistan
3/22/2023	23.48S, 66.51W	6.5	84 km (52 miles) NNW of San Antonio de los Cobres, Argentina

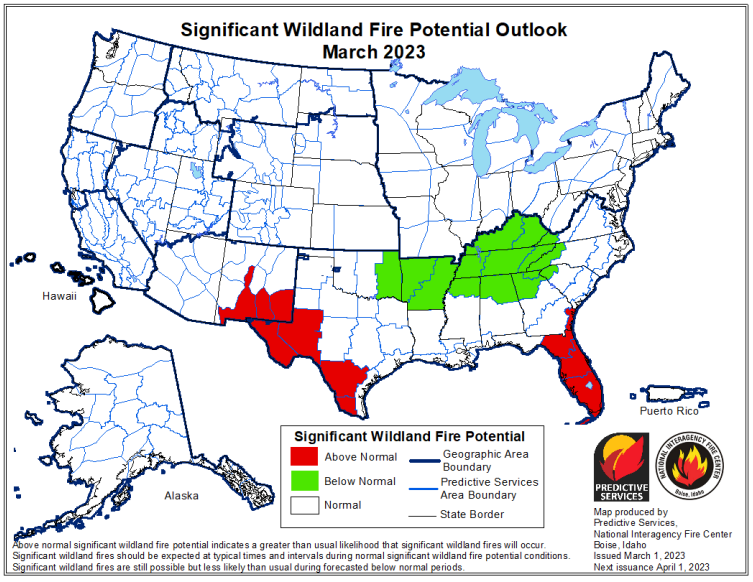
Source: United States Geological Survey

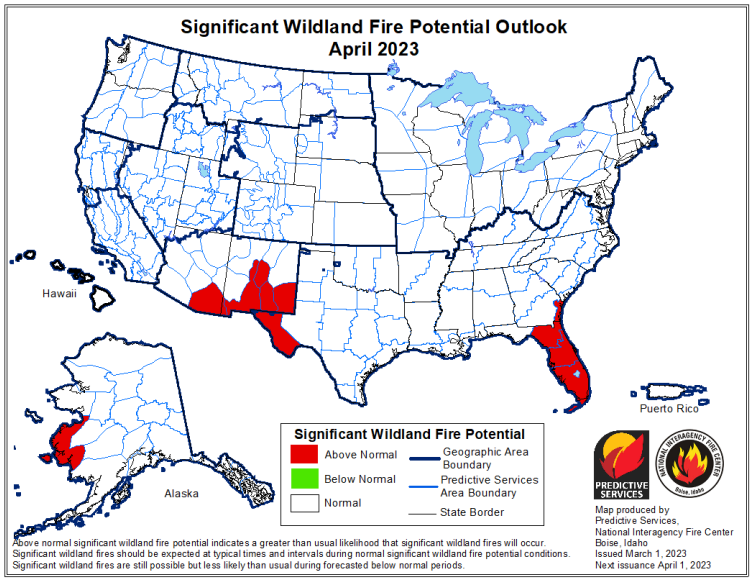
U.S. Hazard Outlook



Source: Climate Prediction Center (NOAA)

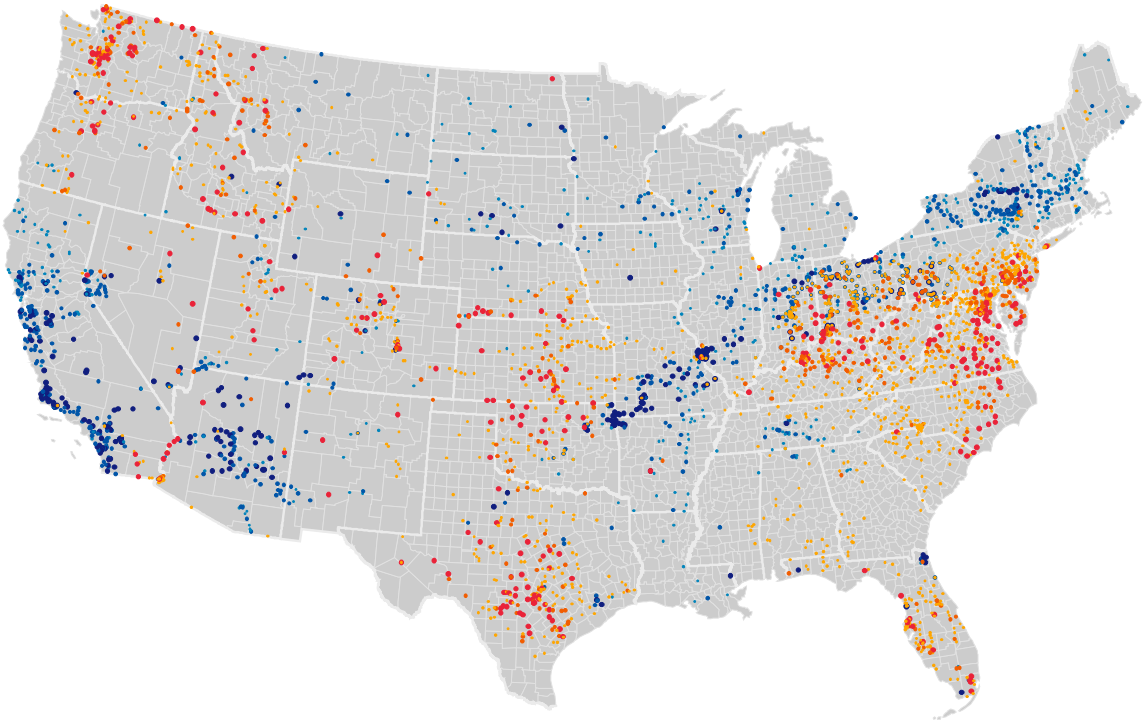
U.S. Wildfire: Significant Fire Risk Outlook & Activity





Source: NIFC

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.

Source: United States Geological Survey

Source Information

United States: Flooding & Severe Convective Storm

Weather Prediction Center
Storm Prediction Center

Ecuador and Peru: Earthquake

U.S. Geological Survey (USGS)
The Risk Management Secretariat of Ecuador (SGR)
The National Institute of Civil Defense of Peru (INDECI)
Deadly earthquake in Ecuador brings grief and fear, *NBC News*

Natural Catastrophes: In Brief

Powerful earthquake kills at least 13 people in Afghanistan and Pakistan. CNN
CAMEROON: Flash floods kill several people in the city of Buea. Afrik21
Floodlist
USGS

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