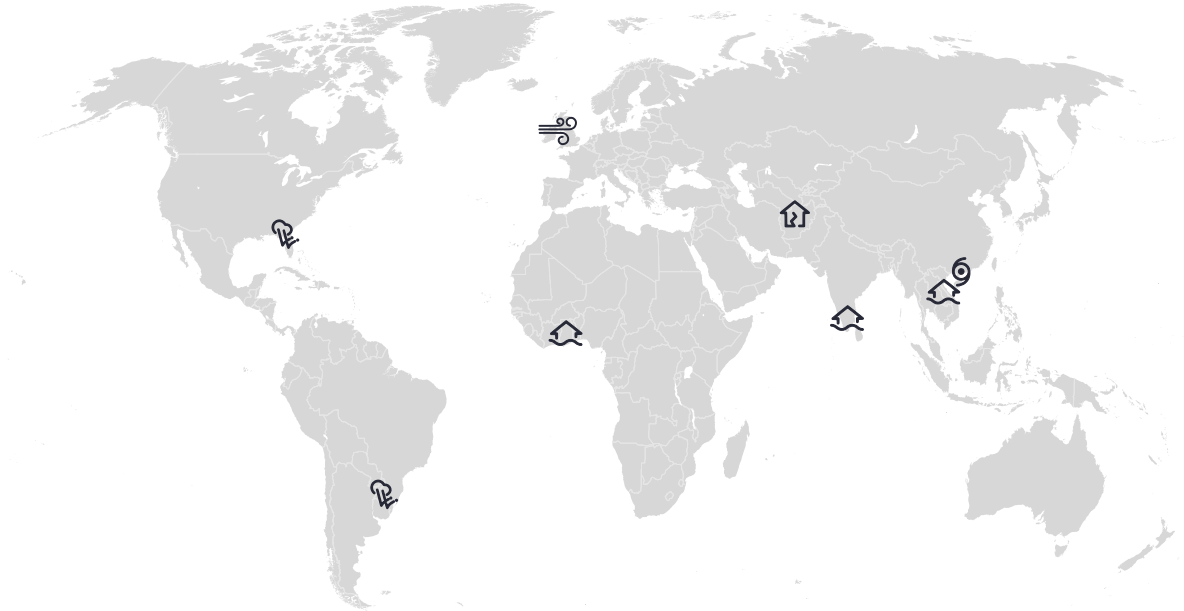


Weekly Cat Report

October 20, 2023



Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (\$)	Page
Severe Convective Storm	United States	0	10s of millions	3
Storms Babet & Aline	Western Europe	1	10s of millions	5
Earthquakes (Update)	Afghanistan	1,380+	10s of millions	7
Flooding	India	0	Millions	9
Flooding	Vietnam	2	Unknown	9
Flooding	Ghana	0	Unknown	9
Severe Convective Storm	Brazil	0	Unknown	9
Typhoon Sanba	China, Vietnam	2	Millions	9

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>

On October 19, we released the Q3 Global Catastrophe Recap. The document can be accessed [here](#).

United States: Severe Convective Storm

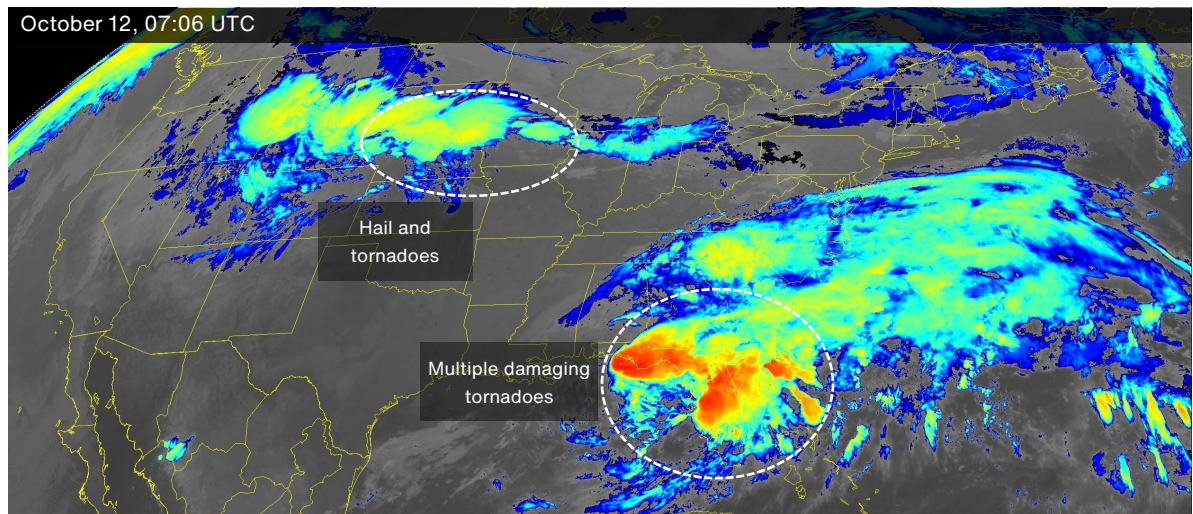
Overview

Two separate storm systems triggered severe thunderstorms across central Florida and the central United States on October 11-12. Main impacts included small hail and several damaging tornadoes. Central Florida was especially impacted as three EF-2 tornadoes caused considerable damage to multiple communities. Total economic and insured losses could reach into the tens of millions USD.

Meteorological Recap

Florida

Ahead of a low-pressure system traversing the northern Gulf of Mexico, strong storms affected parts of central Florida overnight on October 11-12. Ample wind shear and moisture advection along a warm front allowed severe thunderstorms to develop after dark. Aside from heavy rainfall, these storms also produced 7 tornadoes, according to the NWS Tampa Bay and Jacksonville offices. Notably, three of these tornadoes received preliminary EF-2 ratings with estimated peak wind speeds of 115-125 mph (185-201 kph). The Florida communities of Clearwater, Dunedin, Crystal River, and Palm Coast were significantly impacted by these strong twisters.



Central United States

A separate low-pressure system brought two rounds of severe thunderstorms to parts of the central U.S. on October 11-12. A developing warm front triggered the first round of storms late on October 11, with hail being the primary hazard. Some impacts from small hail were seen over eastern Iowa, including near Cedar Rapids.

The second round of severe convection emerged during the afternoon of October 12. Supercell thunderstorms over south-central Nebraska produced 6 tornadoes, including an EF-1 tornado near the

small community of Hildreth. Minor impacts in this rural area of Nebraska resulted from these primarily weak tornadoes.

The table below lists the strongest tornadoes recorded on October 11-12, with preliminary wind estimates provided by the NWS:

Location	Start Date, Local Time	Rating	Est. Peak Wind (mph)	Est. Peak Wind (kph)
Crystal River, FL	Oct. 12, 2:08 AM EDT	EF-2	125	201
Clearwater/Dunedin, FL	Oct. 12, 1:47 AM EDT	EF-2	115	185
Palm Coast, FL	Oct. 12, 4:56 AM EDT	EF-2	115	185
Hildreth, NE	Oct. 12, 3:53 PM CDT	EF-1	90	145

Event Details

Storms over the central U.S. on October 11-12 caused relatively minor impacts overall. Some damage to farming equipment and a few homes was noted from the several tornadoes in Nebraska, especially in Hildreth. More minor damage was reported in eastern Iowa as a result of small hail.

However, more significant impacts occurred in Florida due to multiple, strong EF-2 tornadoes. Several homes and vehicles were heavily damaged in Palm Springs, Clearwater, and Dunedin. Other homes sustained more extensive exterior wall damage in Crystal River. Downed powerlines and scattered tree damage were also noted across several Florida communities.



EF-2 Tornado Damage in Crystal River, Florida

Source: NOAA DAT

Financial Loss

Due to notable tornado damage, particularly in central Florida, total economic and insured losses could reach into the tens of millions USD.

Western Europe: Storms Babet & Aline

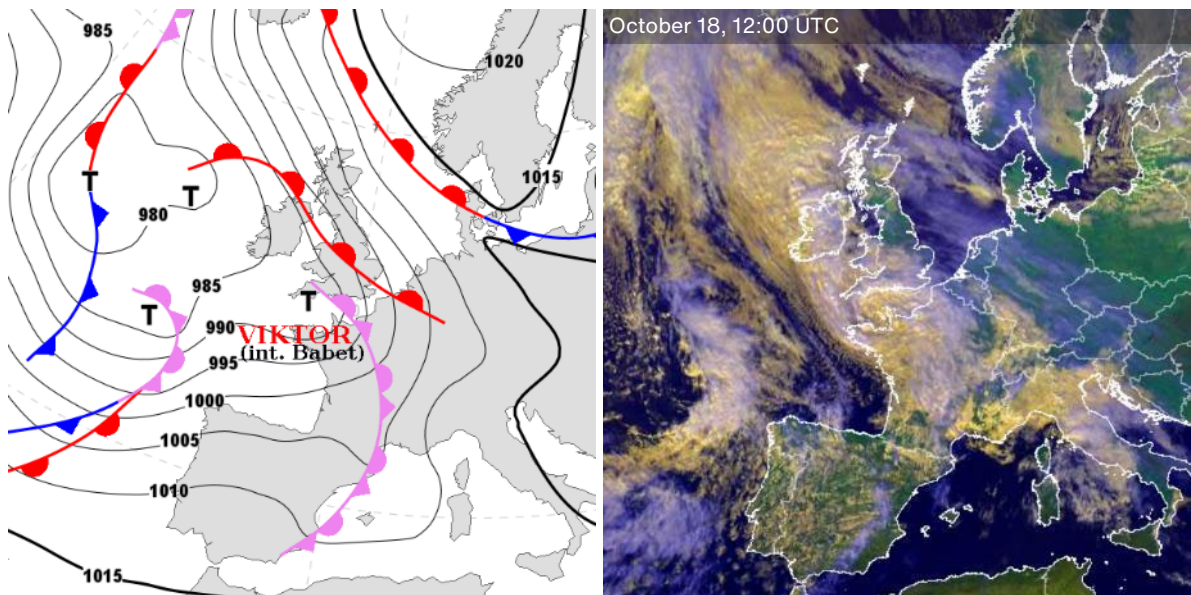
Overview

Storm Babet, the second named extratropical cyclone of the season to hit western Europe, brought excessive rainfall, flash flooding and strong winds particularly to southern parts of Ireland and to Scotland on October 18-20. Additional impacts are expected due to a following storm, Wolfgang (Aline), which already contributed to localized flooding in parts of Spain. Total aggregated economic losses from both events can potentially reach tens of millions EUR.

Meteorological Recap

A low-pressure system, named Viktor by FU Berlin, hit parts of northwestern Europe between October 17 and 20. The system was named **Babet** by the group of countries in northwestern Europe (UK, Ireland, the Netherlands) as the second storm of the season. The low-pressure area brought strong winds and localized heavy rainfall in parts of Portugal, Spain, and western France on October 17, however, **heavy rainfall** that impacted Ireland and the United Kingdom on October 18-20 was the primary hazard related to this storm. Orange rain warnings were issued for some counties in southern Ireland, preceding heavy rainfall of over 100 mm (3.9 inches) in less than 48 hours across the region.

A rare red warning for heavy rainfall was issued by the UK's Met Office on October 18, the first such warning since February 2020. The storm generated strong wind gusts up to 110 kph (70 mph) and excessive rainfall, particularly across the east of Scotland. Cumulative event rainfall in excess of 150 mm (5.9 inches) triggered localized severe flash flooding.



The table below highlights the highest 36-hour rainfall totals recorded at Scottish meteorological stations during the period from October 18 (06:00 PM UTC) to October 20 (6:00 AM UTC), according to

the Scottish Environment Protection Agency (SEPA). Recent event totals approached or even exceeded a mean monthly worth of rain for this region.

Location	36-hour Rainfall (mm)	36-hour Rainfall (inch)	Station Monthly Mean (mm)
Waterside Perth	174.8	6.88	132.1 (5.20 in)
Invermark	157.0	6.18	132.0 (5.20 in)
Charr	141.0	5.55	133.1 (5.24 in)
Murton	103.8	4.09	92.0 (3.62 in)
Glenmuick	103.0	4.06	143.9 (5.67 in)

Additional impacts are expected during the upcoming days due to a following low-pressure system, named Wolfgang; the storm was also named **Aline** by a group of Western European countries. It is expected to aid in the development of a significant rainfall episode in southeastern France, as well as potential coastal flooding and notable rain in northern Germany. The frontal system associated with the storm resulted in localized flooding in parts of Spain. Notable incidents occurred in Madrid, with traffic disruption and some flooding reported.

Event Details

Windstorm Babet resulted in notable flooding of residential homes and businesses, caused traffic disruptions and cut power across northwestern Europe, primarily in Ireland and the United Kingdom.

Already on October 17, relatively minor storm-related impacts were reported in Faro, southern **Portugal**, where the local international airport was affected by flash flooding. On October 18, the storm started to affect southern **Ireland**, with Cork and Waterford County being the worst affected by intense rain, which caused significant flash flooding and damaged several roads. **Cork** was one of the hardest hit, reporting dozens of roads being impassable, hundreds of cars left stranded and hundreds of homes and businesses inundated. Over 100 additional properties were flooded in Midleton.



Flooding in Midleton, Ireland
Source: Cork County Council

Notable storm impacts were reported across northern parts of the **United Kingdom**. The most severe flooding triggered by heavy rainfall occurred across the east of Scotland. As of October 20, five severe flood warnings were in place in Brechin, Finavon and Tannadice, Kinnaird/Bridge of Don, Logie Mill and Craigo, and Marykirk, according to SEPA. A woman died after being swept into a river in Angus municipality. Some 20,000 properties were hit by power cuts as the storm passed, and thousands of people were forced to leave their homes, most of them in the town of Brechin.

Financial Loss

Total economic losses from both events were initially expected to reach into the tens of millions EUR, possibly higher.

Afghanistan: Earthquakes (Update)

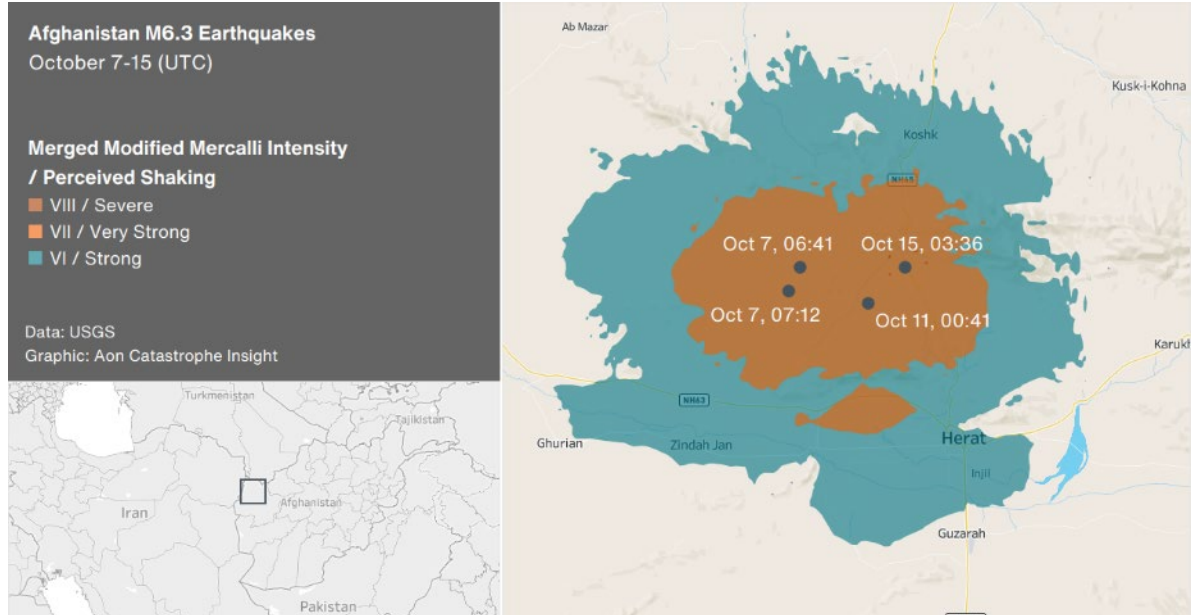
Overview

Another strong, magnitude-6.3 earthquake struck Herat Province in western Afghanistan on October 15, following the previous strong tremors between October 7 and 11 (see previous Weekly Cat Report). The series of earthquakes caused thousands of fatalities and produced considerable structural damage across the region.

Seismological Recap

Areas in northwest Afghanistan, still reeling from the powerful October 7 and October 11 earthquakes and subsequent aftershocks, were rocked by two more strong aftershocks early on October 15. The epicenters of the M6.3 and M5.4 aftershocks were both located roughly 30 km (18 miles) north of Herat. Both tremors also occurred at shallow depths at 10 km (6 miles) or less below the earth's surface. The occurrence of a series of such strong earthquakes is rather rare in this region.

According to USGS, approximately 4,000 people were exposed to severe shaking and more than 370,000 to very strong shaking after the latest strong tremor. The area between epicenters perceived very strong shaking four times in just 8 days.



Event Details

Preliminary impacts from the newest aftershocks include 4 deaths and at least 153 injuries. The number of collapsed buildings across the affected area remains unclear. Assessments by ECHO partners are ongoing. According to the latest figures reported by the UN OCHA, the total casualty toll approaches 1,400 fatalities and 1,900 injured. Thousands of buildings are expected to be completely destroyed or damaged.

Earthquake Event	People Affected	Fatalities	Injuries
October 7, 06:41	4,670,000	1,384	1,853
October 7, 07:12	4,700,000	-	-
October 11	4,630,000	1	140
October 15	4,630,000	4	153

Financial Loss

As damage assessment and rescue operations remain ongoing, total economic losses caused by the series of earthquakes are still unclear. Given the high number of damaged structures, material damage is expected to be considerable. According to the USGS's PAGER methodology, the first two magnitude-6.3 earthquakes both had the highest likelihood of resulting in economic damage in the millions USD. The third and fourth strong earthquakes both had the high potential to reach tens of millions USD.

Natural Catastrophes: In Brief

Flooding (India)

Extreme rainfall triggered flash flooding and landslides throughout Kerala state in southern India on October 14-16. India Meteorological Department issued yellow and orange alerts for several districts in Kerala, including Pathanamthitta, Kollam, Alappuzha, and Thiruvananthapuram. Among the worst affected districts is Thiruvananthapuram, the capital city of Kerala, which saw 210 mm (8.27 inches) of rain on October 14-15 alone. Hundreds of homes were flooded in the district, especially near the Technopark Campus area.

Flooding (Vietnam)

Floods accompanied by heavy rains have affected central Vietnam, particularly Quang Tri, Thua Thien-Hue, and Quang Nam Provinces, since October 10. According to the ADINet and local authorities, two people died, and thousands have been affected. More than 1,500 houses have been flooded. Property and agricultural damage assessments remain ongoing.

Flooding (Ghana)

Heavy rainfall since October 11 caused water levels to overflow at two hydroelectric dams in Akosombo and Kpong in southeast Ghana. Eight districts have been heavily impacted and nearly 26,000 people were evacuated in the Volta River region, according to the National Disaster Management Organization (NADMO). More than 8,000 people have also been rescued from the flood waters.

Severe Convective Storm (Brazil)

Severe thunderstorms generated intense rainfall and strong wind gusts across southeastern Brazil, affecting the Rio Grande do Sul and Santa Catarina states on October 16-17. Storms left tens of thousands of people without power, downed trees, and caused damage to dozens of houses. Rains triggered localized flash flooding that forced evacuations of more than 26,000 people in Santa Catarina alone.

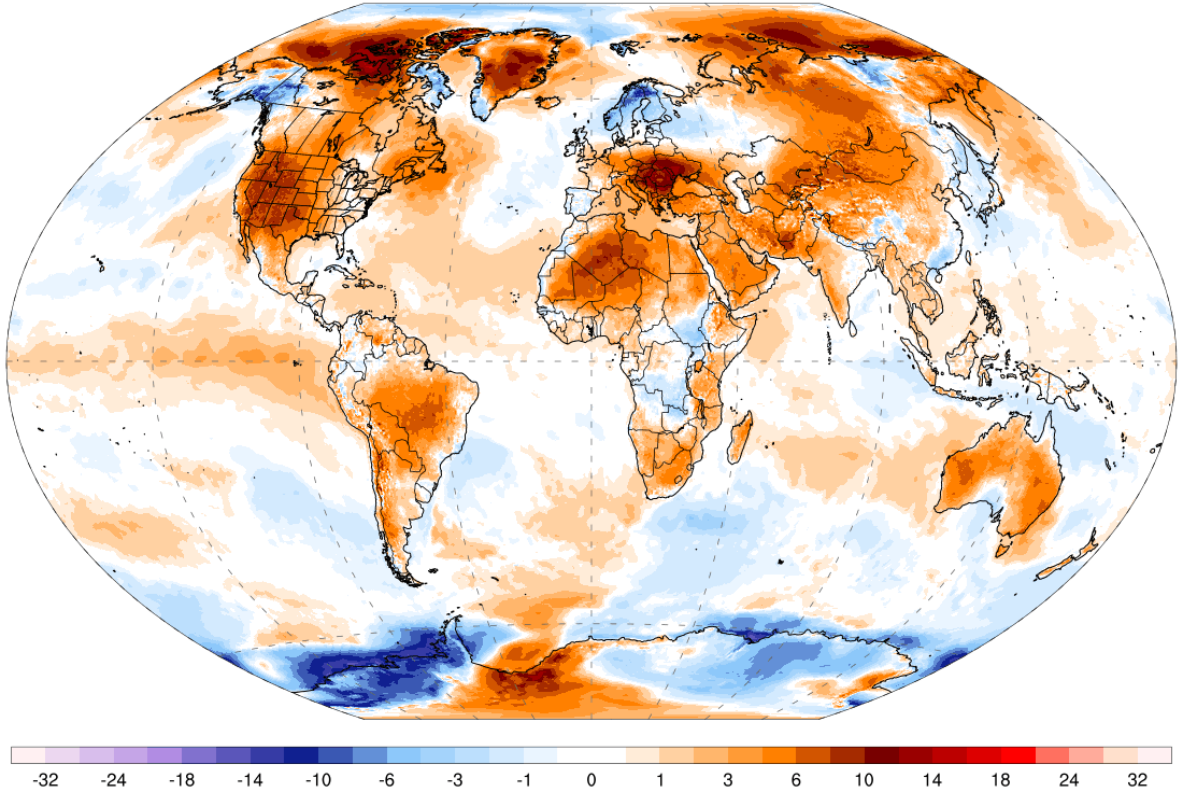
Typhoon Sanba (China)

Heavy rainfall from Typhoon Sanba affected parts of southern China on October 17-19. Despite officials issuing only a blue alert for Sanba, China's lowest typhoon alert, the storm still caused flooding in the Hainan and Guangdong Provinces. The city of Zhanjiang was especially impacted as 100-220 mm (up to 8.7 inches) of rain fell on October 17-19, according to the Central Meteorological Observatory in China. Several roads and numerous vehicles were damaged by floodwaters. Elsewhere in Vietnam, impacts from Sanba caused 2 ships to sink on October 18, according to the Vietnam Disaster and Dyke Management Authority (VDDMA). Two people were killed and 78 others were rescued as a result of the sinking ships.

Global Temperature Anomaly Forecast

GFS 2m T Anomaly (°C) [CFSR 1979-2000 baseline]
Days 1-3 Avg | Fri, Oct 20, 2023

ClimateReanalyzer.org
Climate Change Institute | University of Maine

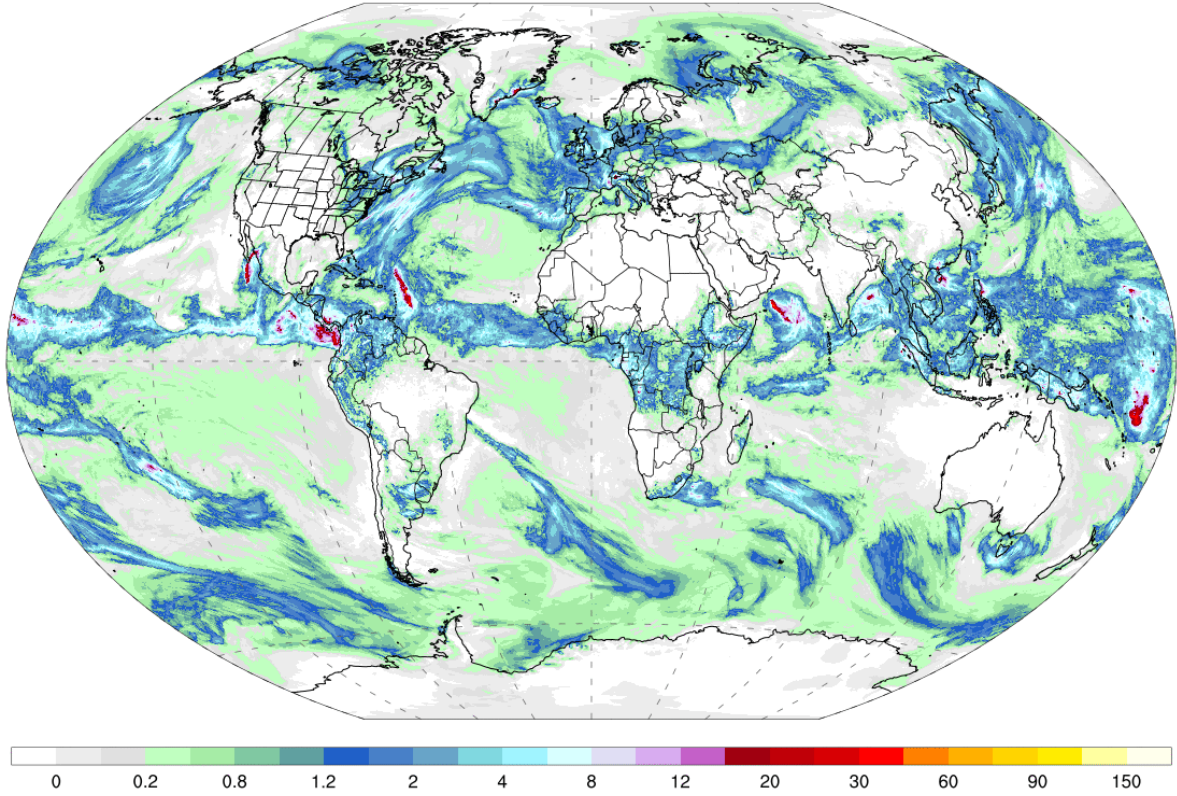


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Forecast

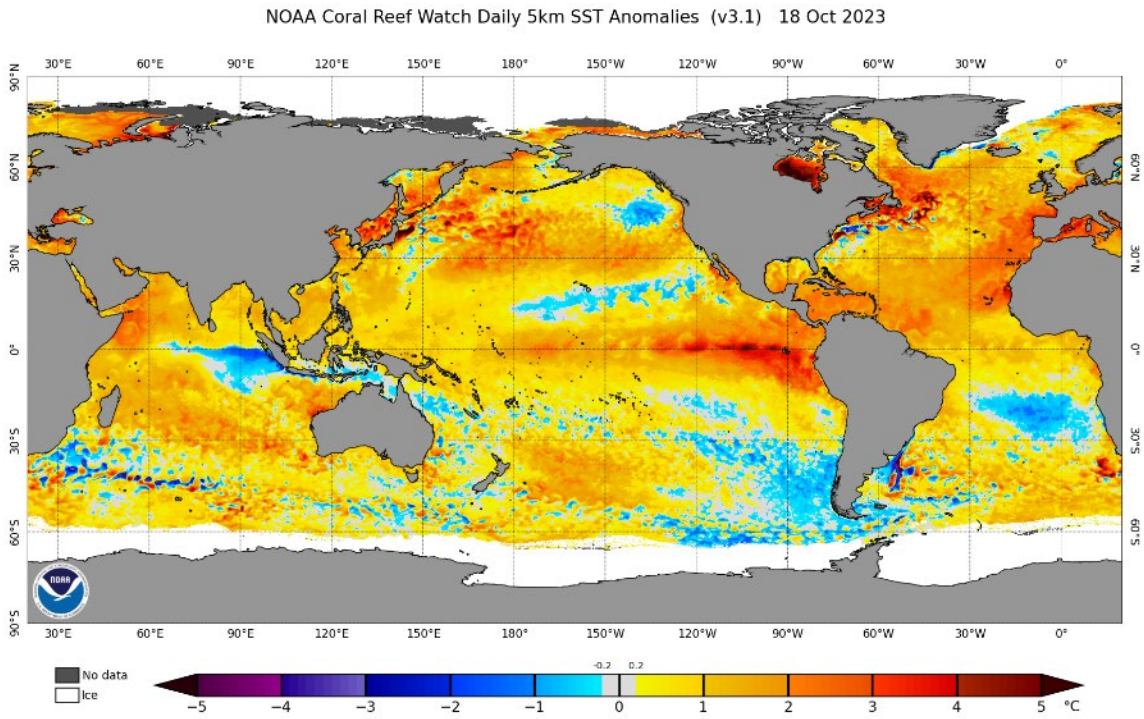
GFS Accumulated Precipitation (cm)
Days 1-3 Total | Fri, Oct 20, 2023

ClimateReanalyzer.org
Climate Change Institute | University of Maine



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

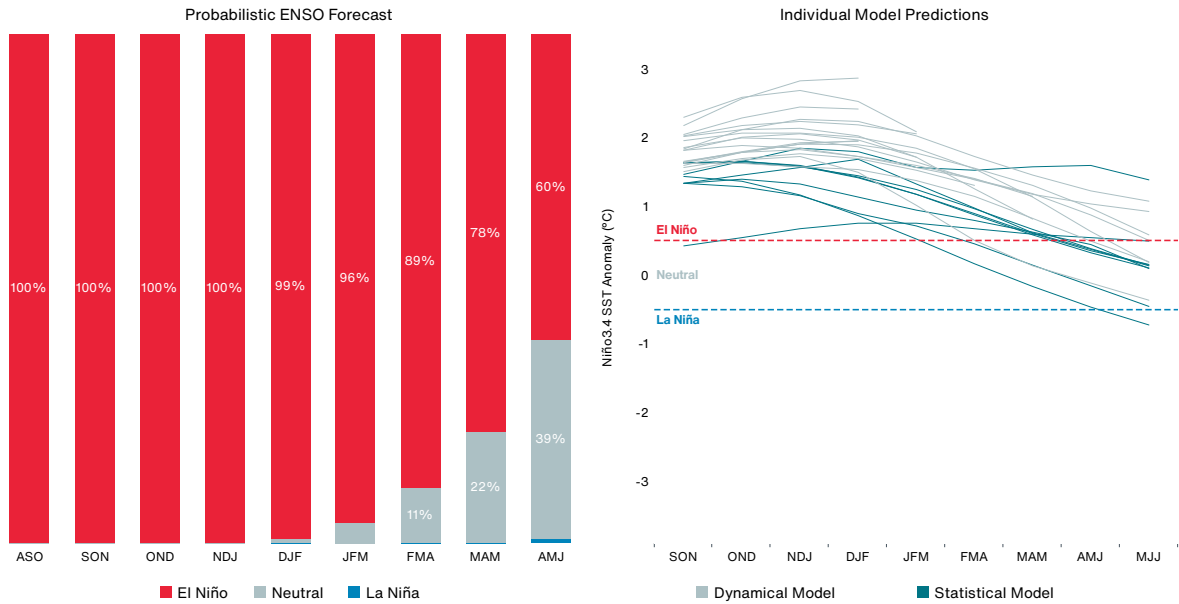
Weekly Sea Surface Temperature (SST) Maps (°C)



El Niño-Southern Oscillation (ENSO)

Probabilistic ENSO Model Projections: September 2023

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



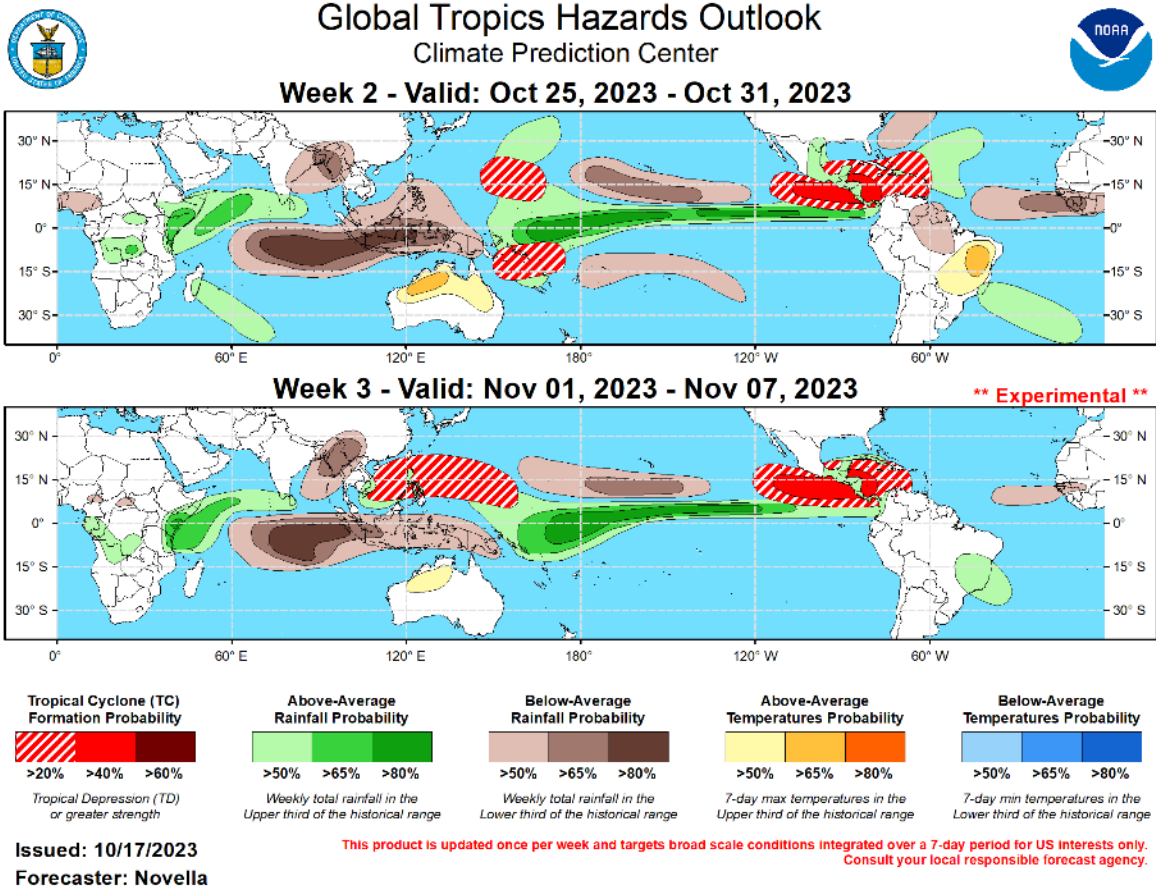
El Niño: Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.

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.

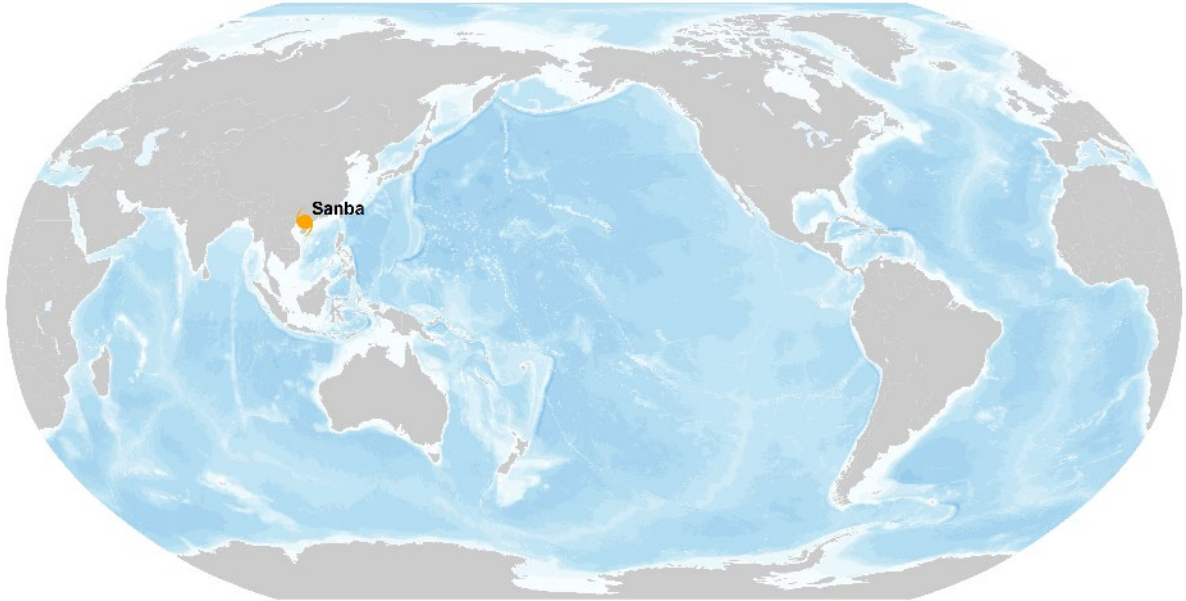
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

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

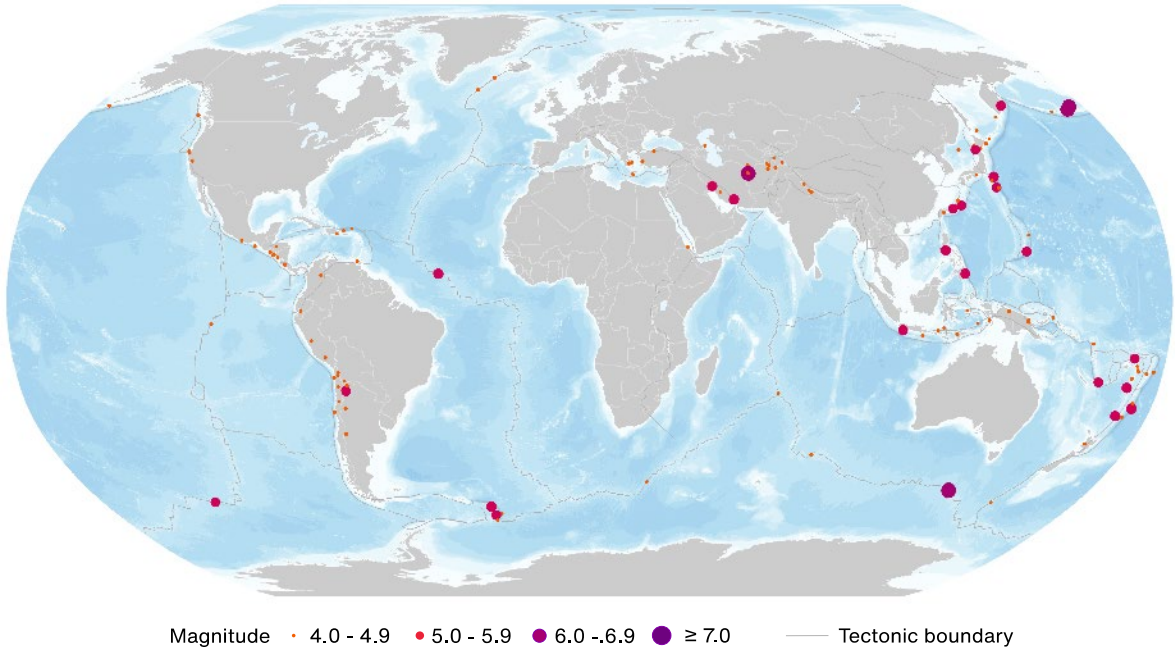
Name	Location	Winds	Center
TY Sanba	21.6N, 109.6E	40	115 miles (185 km) NW from Haikou, China

* 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)

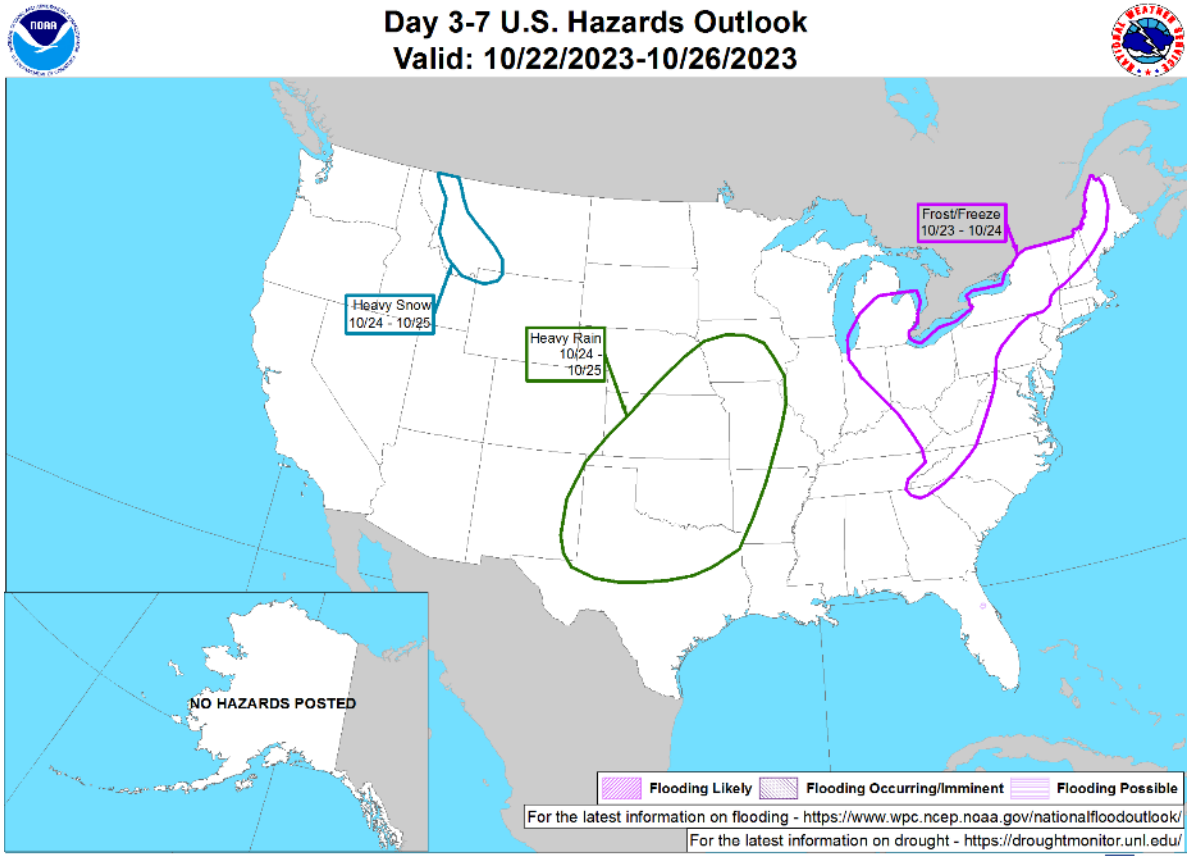
Global Earthquake Activity ($\geq M4.0$): October 13-19



Date (UTC)	Location	Mag	Epicenter
10/13/2023	51.80S, 139.50E	6.0	1,150 km (715 miles) SW of Hobart, Australia
10/15/2023	34.61N, 62.11E	6.3	30 km (19 miles) NNW of Herat, Afghanistan
10/16/2023	53.10N, 175.50W	6.7	13 km (8 miles) NW of Atka, Alaska
10/16/2023	52.44N, 176.85W	6.4	65 km (40 miles) NNW of Adak, Alaska

Source: United States Geological Survey

U.S. Hazard Outlook

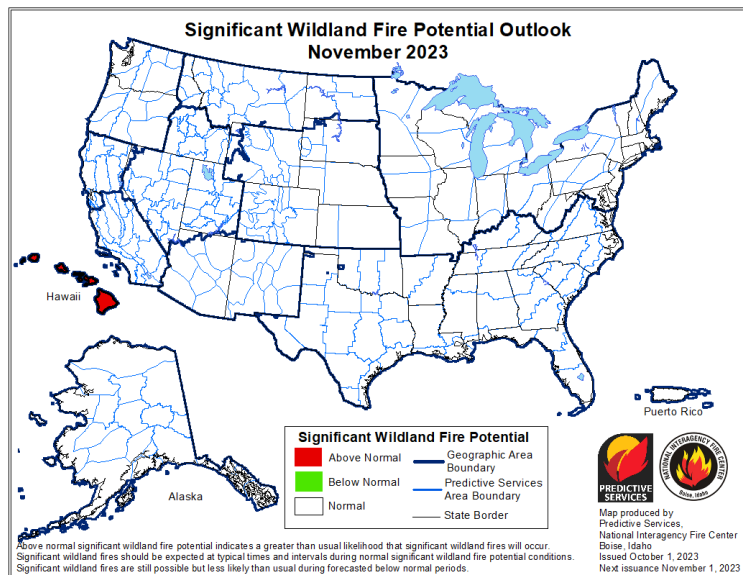
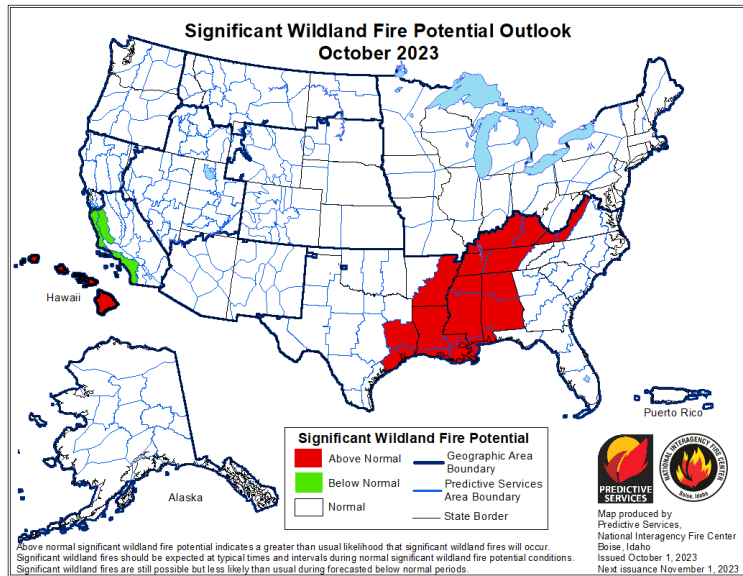


Weather Prediction Center
Made: 10/19/2023 04:26 PM EDT

Follow us:
www.wpc.ncep.noaa.gov

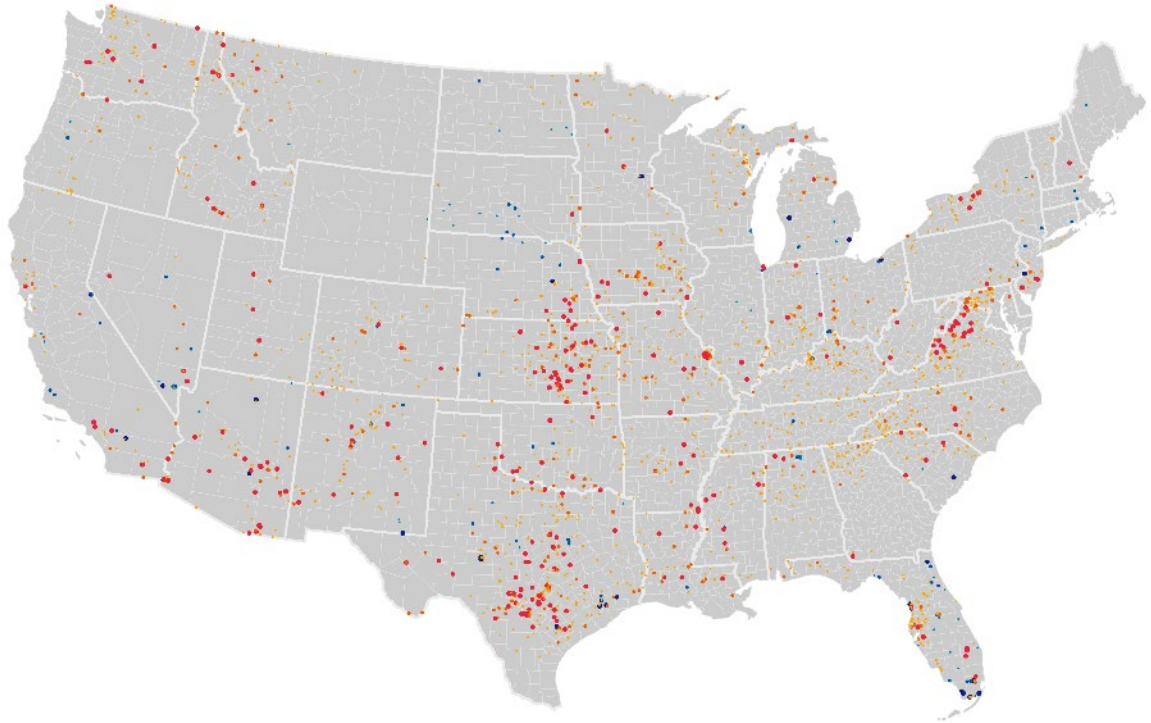
Source: Climate Prediction Center (NOAA)

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



Source: NIFC

U.S. Current Riverine Flood Risk



- | | | | |
|------------------------------------|--------------------------------|---------------------------------|--------------------|
| High Flows
(Percentile) | • ≥ 99 / Above floodstage | Hydrological
Drought | • Severe Drought |
| | • 95 - 99 | | • Moderate Drought |
| | • 90 - 95 | | • Below Normal |

A $\geq 99^{\text{th}}$ 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 stream 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: Severe Convective Storm

NWS

PHOTOS: National Weather Service confirms five tornadoes in south-central Nebraska, *KLKN ABC8*

Reported tornado in Crystal River damages homes and businesses, *WCJB ABC 20*

Early morning storms leave path of damage from Tampa Bay into north Florida. No injuries reported, *The Express*

Western Europe: Storms Babet & Aline

UK's Met Office

Irish Met Éireann

Scottish Environment Protection Agency (SEPA)

Storm Babet: Millions of euros in damage as army deployed to parts of Cork and new rain warning issued for Dublin, *Irish Independent*

Storm Babet to unleash heavy rain, damaging winds in northwestern Europe, *AccuWeather*

Storm Babet floods cause extensive damage in Glanmire as residents scramble to protect homes, *Irish Examiner*

Storm Babet: Rescuers search Brechin homes after body pulled from river, *BBC*

Afghanistan: Earthquakes (Update)

USGS

UN OCHA

Powerful Earthquake Hits West Afghanistan a Week After Quakes Killed Thousands In Same Region, *Time*

Natural Catastrophes: In Brief

ASEAN Disaster Information Network (ADINet)

National Disaster Management Organization (NADMO)

Ghana floods: 'My entire farm is under the water and so is my house,' *BBC*

China renews blue alert for Typhoon Sanba, *Shine*

Typhoon Sanba brought torrential rain to Guangdong, Zhanjiang roads flooded into rivers, road surface collapsed, vehicles trapped, *HK01*

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