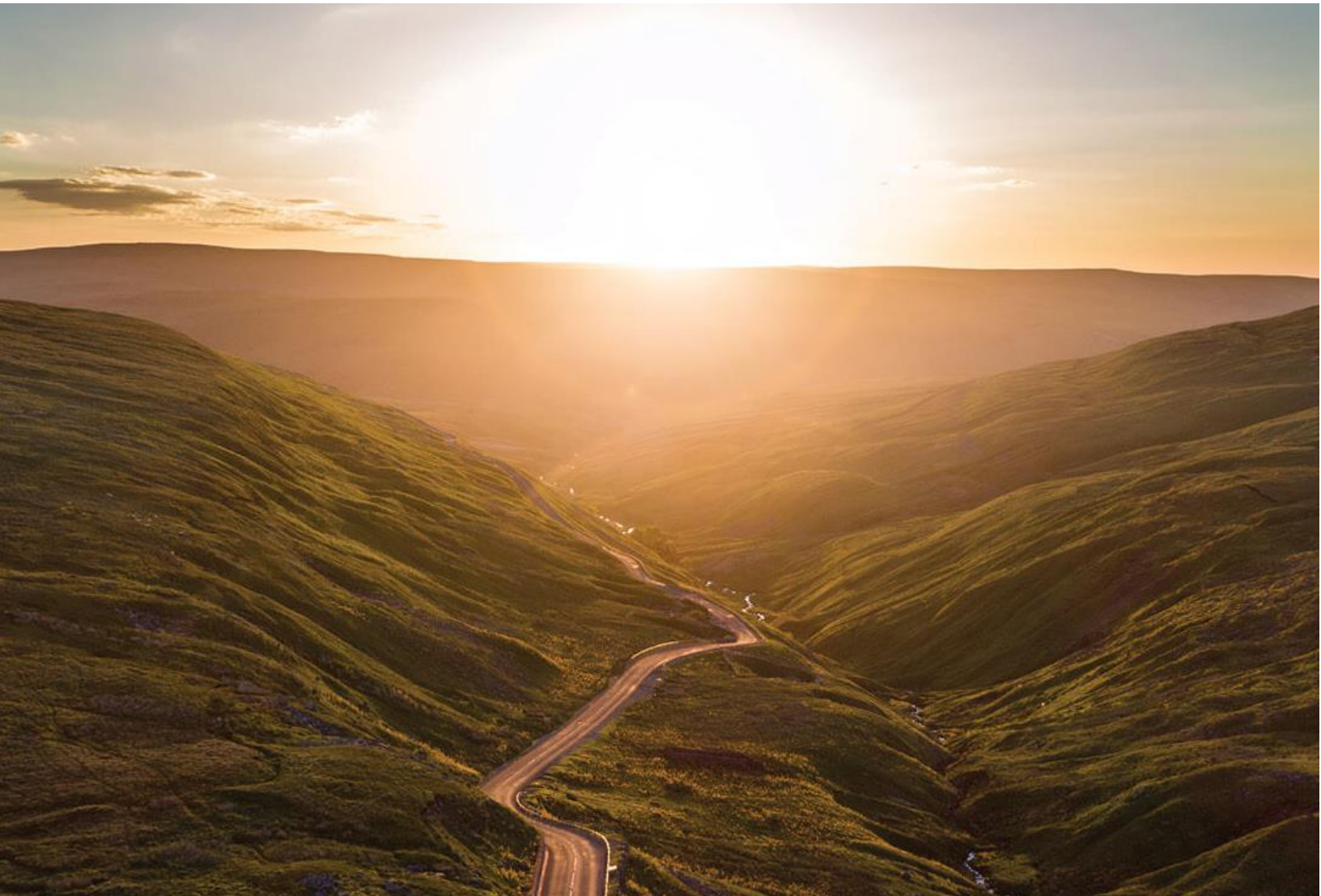
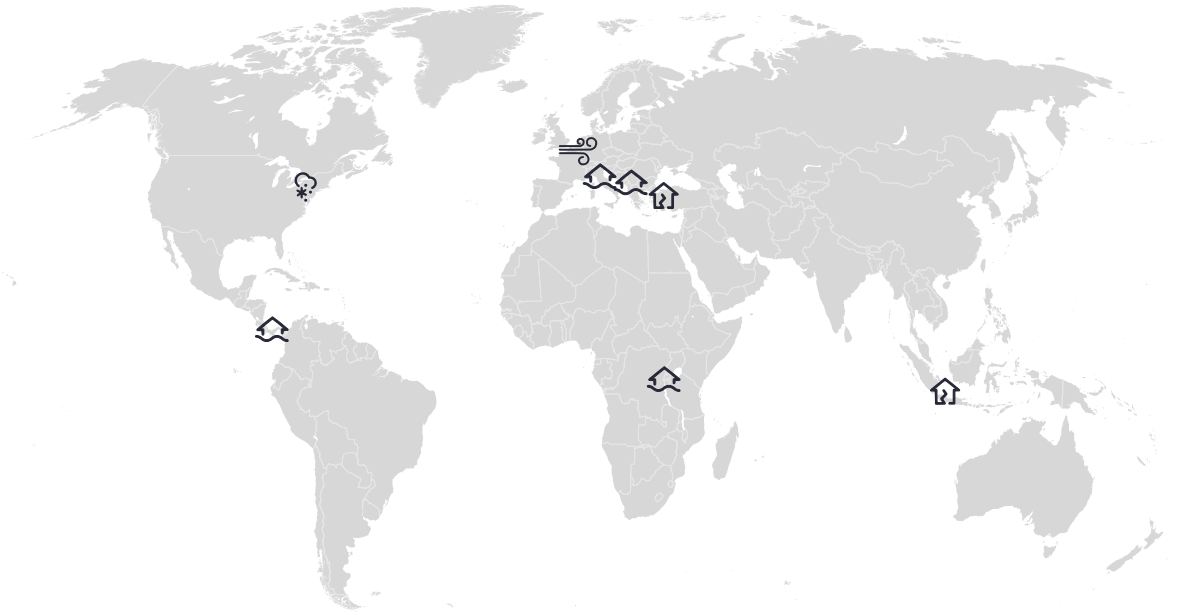
Weekly Cat Report

November 25, 2022



Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss ($)	Page
Earthquake	Indonesia	272+	100s of millions	3
Earthquake	Turkey	2	Millions	5
Winter Weather	United States	3	Millions	7
Windstorm Regina	France, Germany	0	Millions	9
Flooding & Landslides	DRC, Rwanda	35+	Unknown	9
Flooding	Southeastern Europe	6+	Millions	9
Flooding & Landslides	Panama	2+	Unknown	9
Flooding	Italy	0	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.

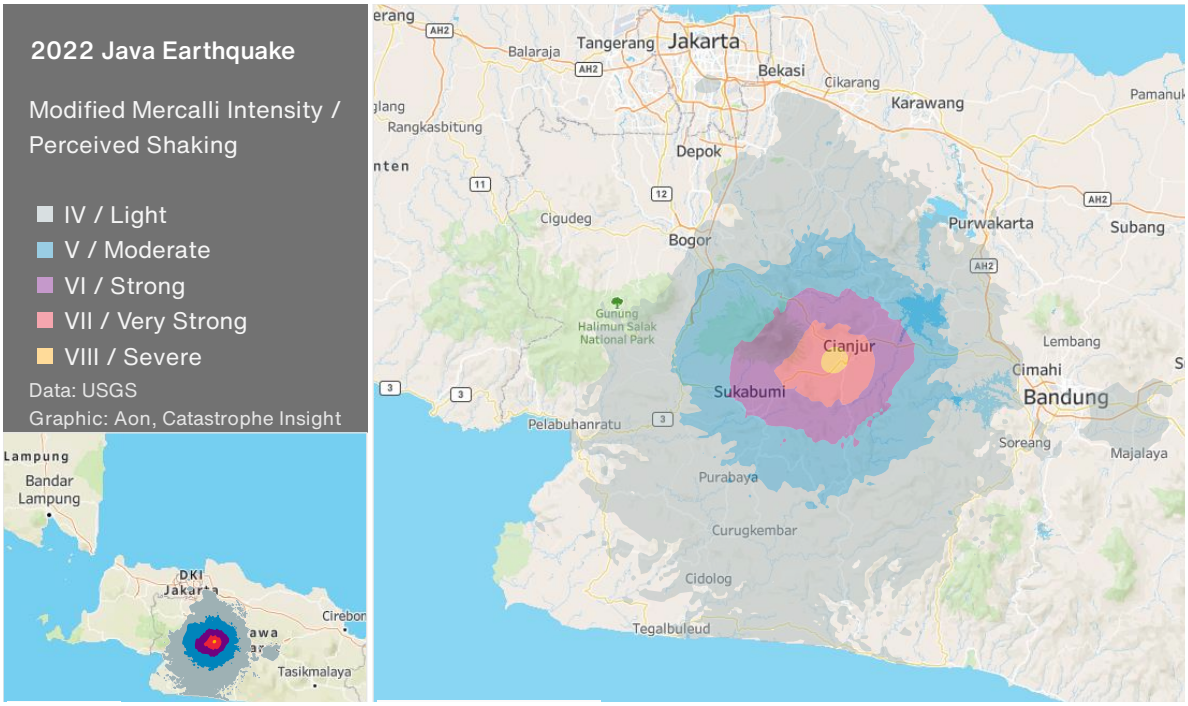
Along with this report, we continue to welcome users to access current and historical natural catastrophe data and event analysis on Impact Forecasting's Catastrophe Insight website: http://catastropheinsight.aon.com

Indonesia: Earthquake

Overview

A deadly magnitude-5.6 earthquake rattled Cianjur, western Java, in the afternoon of November 21, killing at least 272 people and injuring thousands. The United States Geological Survey placed a 44% likelihood of total economic losses reaching into the hundreds of millions in this populated region.

Seismological Recap



A moderate, magnitude-5.6 earthquake struck near Cianjur at a shallow depth of 10 km (6.2 mi) at 1:21 PM local time on November 21. Severe shaking on the Modified Mercalli Intensity (MMI) scale was felt near the epicenter. Tremors lasting up to 15 seconds could also be felt in Indonesian capital Jakarta. Focal mechanism analysis indicated rupture occurring on either a steeply dipping north-striking, right lateral strike-slip fault, or a steeply dipping east-striking, left lateral strike-slip fault within the crust of the Sunda plate. The Australia plate, about 260 km (160 mi) southwest from this event, subducts beneath the Sunda plate at about 59 mm/year (2.3 in/year). Seismic activity is high in this Pacific Ring of Fire. There were 4 earthquakes of magnitude-6.5 and larger within a 250 km (155 mi) radius from this earthquake since 2007. The origin of this temblor was only 18 km (11 mi) away from Ciranjang-hilir, which has an estimated population of 77,000 based on the United States Geological Survey (USGS). Local authorities recorded at least 120 low-intensity aftershocks following the quake.

Event Details

According to Indonesia's National Agency for Disaster Countermeasure (BNPB), the quake had left close to 63,000 people displaced and over 57,000 houses damaged in the Cianjur Regency and the adjoining regions. The total included 22,950 homes with light damage, 12,100 with moderate damage and 22,305 homes that were heavily damaged.

Based on the latest update from BNPB as of November 25, 7:00 local time, at least 272 people were killed, and no fewer than 2,000 people were injured. Additional 39 people remained missing.

Power outages and landslides complicated evacuations and relief in some areas. A state of emergency was declared for 30 days until December 20. Isolated damage and injuries were also reported in Bogor, Sukabumi, and Bandung regencies. Maipark, Indonesia's earthquake reinsurer, reported of skyscrapers swaying in Jakarta.

Structural damage in Cianjur Regency
Source: BNPB

Financial Loss

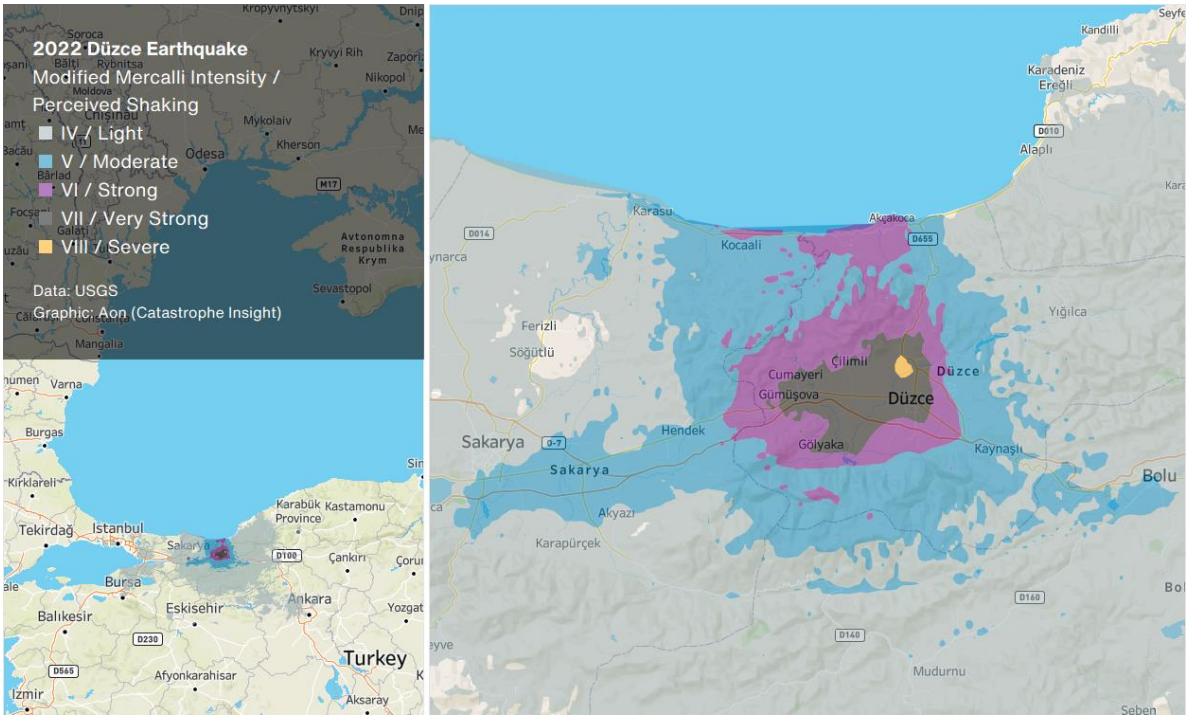
The November 21 earthquake was the deadliest natural hazard event in Indonesia this year. Most of the damage was centered in the Cianjur region, with additional losses reported in populated cities like Bogor, Sukabumi, and Bandung. Economic losses had a 44% chance of reaching into the hundreds of millions, based on the PAGER methodology by USGS. One of the country's largest re/insurers estimated the impact in the lower millions USD.

Turkey: Earthquake

Overview

A strong, magnitude-6.1 earthquake hit Düzce Province, western Turkey on November 23. As of November 24, local authorities reported at least 2 fatalities and 93 injured as a result of the event. Hundreds of structures were likely damaged, as official assessments continued as of this writing.

Seismological Recap



Tectonic summary of the event provided by the United States Geological Survey: "*The November 23, 2022, M 6.1 earthquake near Düzce, Turkey occurred as the result of strike-slip faulting at shallow depth, within the crust. Focal mechanism solutions for the event indicate that rupture occurred on either a moderately-dipping right-lateral fault striking west-southwest, or a steeply-dipping left-lateral strike-slip fault striking north-northwest. The location, depth, and focal mechanism of the earthquake are consistent with the east-west trending, right-lateral North Anatolian Fault. The North Anatolian Fault accommodates much of the right-lateral horizontal motion (23-24 mm/yr) between the Anatolian micro-plate and Eurasian plate as the Anatolian micro-plate is being pushed westward to further accommodate closure of the Mediterranean basin caused by the collision of the African and Arabian plates in southeastern Turkey. At the location of this earthquake, the Arabian plate moves north-northwest at a velocity of about 17 mm/yr relative to the Eurasian plate.*"

Event Details

The event hit Düzce Province, western Turkey on November 23. About 47,000 people were exposed to severe shaking (category VIII on the Modified Mercalli Intensity scale), while more than 180,000 were exposed to very strong shaking.

As of November 24, local authorities (AFAD) reported at least 2 fatalities and 93 injured people in the earthquake. Preliminary results of damage assessments revealed that hundreds of structures were likely damaged. As of November 25, more than 600 ministerial staff were conducting the assessment and determining level of damage. Initially, 71 buildings were identified for demolition.

The United States Geological Survey (USGS) estimated potentially significant damage, placing a 43% likelihood of losses reaching into the hundreds of millions (USD), based on the PAGER methodology.

Financial Loss

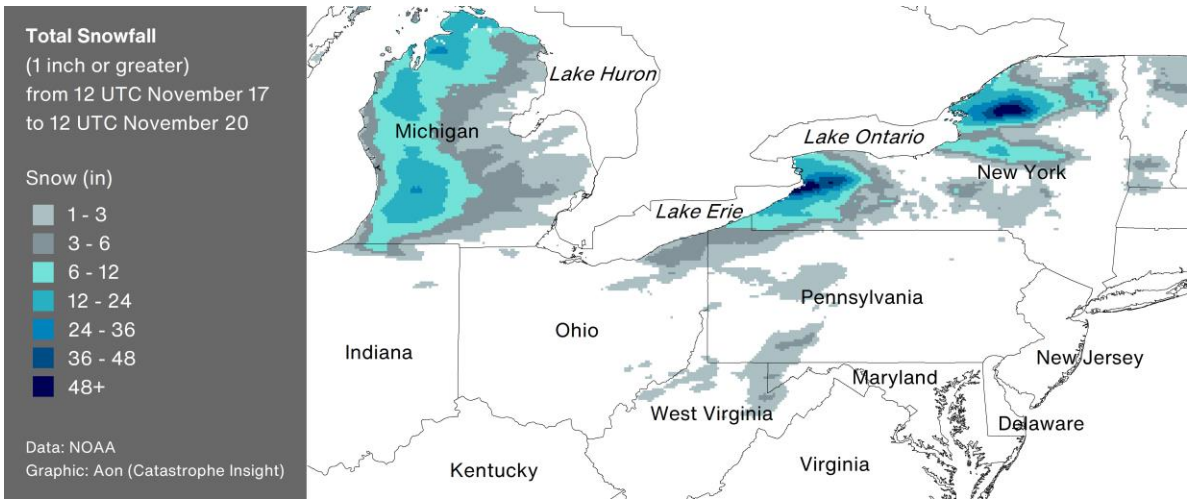
As official damage assessments continue, it is too early to provide a loss estimate for the event. However, given initial indication from local officials, total damage is not expected to be substantial.

United States: Winter Weather

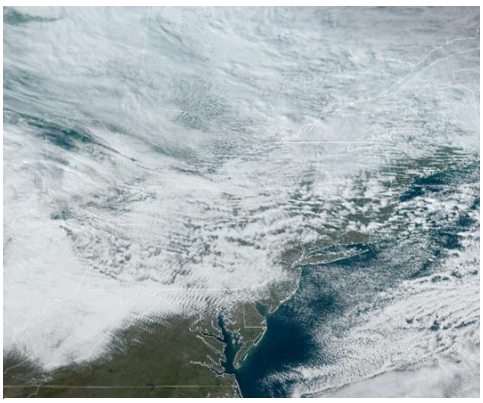
Overview

A historic lake-effect snowstorm generated significant snowfall accumulations in state of New York, United States on November 17-20, with up to 80 inches of snow in a span of several days. The event resulted in at least three fatalities and notable disruption.

Meteorological Recap



A significant long duration snowfall was aided by **lake effect**. A large contrast between the warmer lake water (Ontario and Erie Lakes) and the cold dry air above resulted in enhanced precipitation eastward of the Great Lakes. As the cold air passes over the relatively warm lake waters, heat and moisture are picked up into the atmosphere. This rising air condenses into clouds, that are capable of producing very intense snowfall, usually more than 2 inches (5 cm) per hour. According to NOAA's Great Lakes Environmental Research Laboratory, Lake Ontario's temperature reached its warmest value for mid-November this year, while Lake Erie's temperature is at its second warmest value in 27 years of records.



Precipitation bands east of the Great Lakes
Source: NASA, RAMMB

Table below shows the highest 3-day snowfall totals between November 17-20, according to National Weather Service. Buffalo Niagara International Airport received a total of 36.6 in (93 cm), Buffalo's fifth highest 3-day snow accumulation on record. Snowfall totals varied significantly by a few miles regarding wind direction which is a key component in determining which areas will receive snow from lake effect.

Station	State	3-day Snowfall Totals (in)	3-day Snowfall Totals (cm)
Hamburg	New York	81.2	206
Orchard Park		80.0	203
Blasdell		76.0	193
Elma		67.0	170
East Aurora		51.3	130

Event Details

Storm generated rather minor material damage, particularly in western New York State, in the **Buffalo area** on edge of Lake Erie, and in **Watertown area** on edge of Lake Ontario. Local government declared a state of emergency for both areas on November 17, including 11 counties - Jefferson, Lewis, St. Lawrence, Oswego, Genesee, Erie, Cattaraugus, Chautauqua, Niagara, Oneida and Wyoming. About 150 members of the National Guard were deployed to help with snow removal in hardest hit areas to protect essential infrastructure. At least three fatalities were related to snowstorm. Many vehicles were reported to get stuck due to dozens of impassable roads. Nearly 90 crashes were reported and almost 290 people were rescued from roads. Several schools remained closed after weekend.

Financial Loss

Although lake-effect snowstorm generated a massive amount of snow, direct economic loss is not expected to be significant, despite notable disruption and clean-up.

Natural Catastrophes: In Brief

Windstorm Regina (Western Europe)

A relatively minor windstorm, named Regina by the FU Berlin, affected parts of Western Europe on November 17. Some wind-related damage was observed in northwestern France and northern Germany. Notably, an F2-rated tornado with roughly a 10-kilometer long path damaged approximately 50 structures in Urexweiler in Saarland, Germany. Another, F1-rated event was reported from Suippes near Reims, France. Total losses from the event were likely to reach into the millions EUR.

Flooding & Landslides (Democratic Republic of Congo, Rwanda)

Two days of flooding and landslides on November 17-18 in eastern DRC had claimed 32 lives. Several homes in central Rubaya and Bihambwe collapsed, and large areas of crops were damaged. The capital city of Rwanda, Kigali, was also inundated with at least three fatalities, which was reported on November 17.

Flooding (Southeastern Europe)

Torrential rainfall since November 17 triggered widespread riverine flooding and landslides in several countries in Southeastern Europe, affecting thousands of people in the region. Notable damage on hundreds of houses and vehicles was incurred in Albania, Kosovo, Montenegro and Serbia. At least 3,000 ha (7,400 acres) of crops was flooded in Albania alone. No fewer than six people were killed in Albania (2), Montenegro (3) and Serbia (1). Total losses were expected to be in the millions (USD).

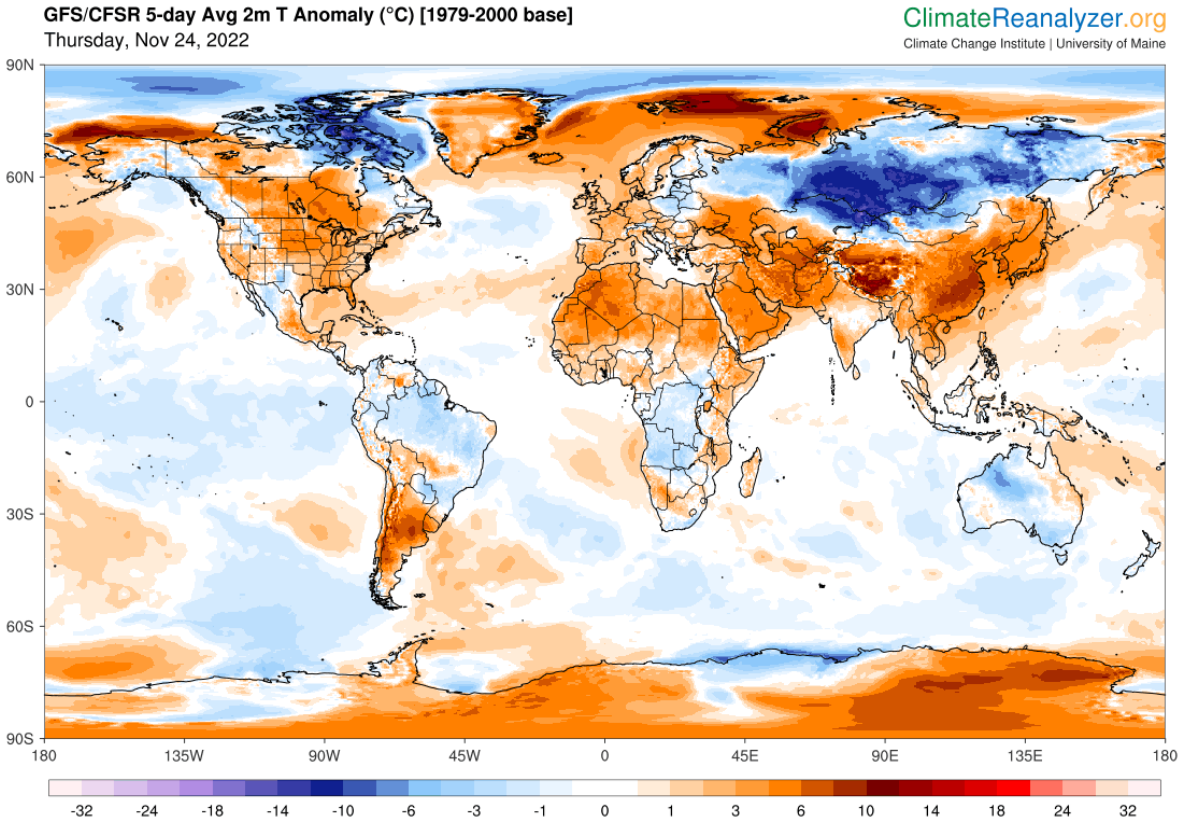
Flooding & Landslides (Panama)

Heavy rainfall accompanied with flooding and landslides continues to affect several provinces in Panama over past week. On November 18, around 100 houses were damaged in the provinces of Herrera and Los Santos. Landslide event occurred in Colón Province on November 21, claimed at least two lives and minor material damage, according to the National Civil Protection System (SINAPROC).

Flooding (Italy)

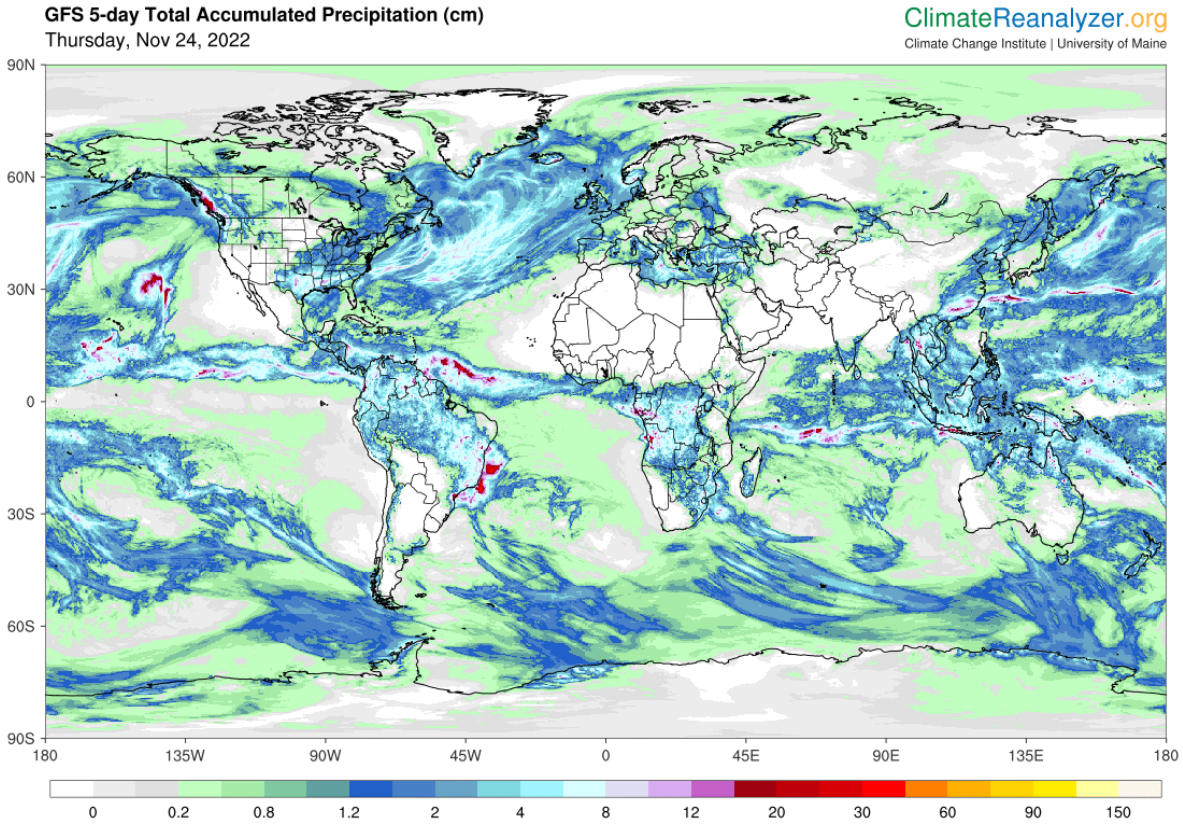
Severe weather affected several regions across Italy on November 22-23. Primary hazards related to low Denise (named by FU Berlin) were flooding, strong winds, high waves and storm surge. Local emergency services carried out more than 2,500 interventions, particularly in the regions of Lazio, Campania and Sardinia. The storms generated structural damage along with downed trees and power lines. Total economic losses were expected to be in the millions (USD).

Global Temperature Anomaly Forecast



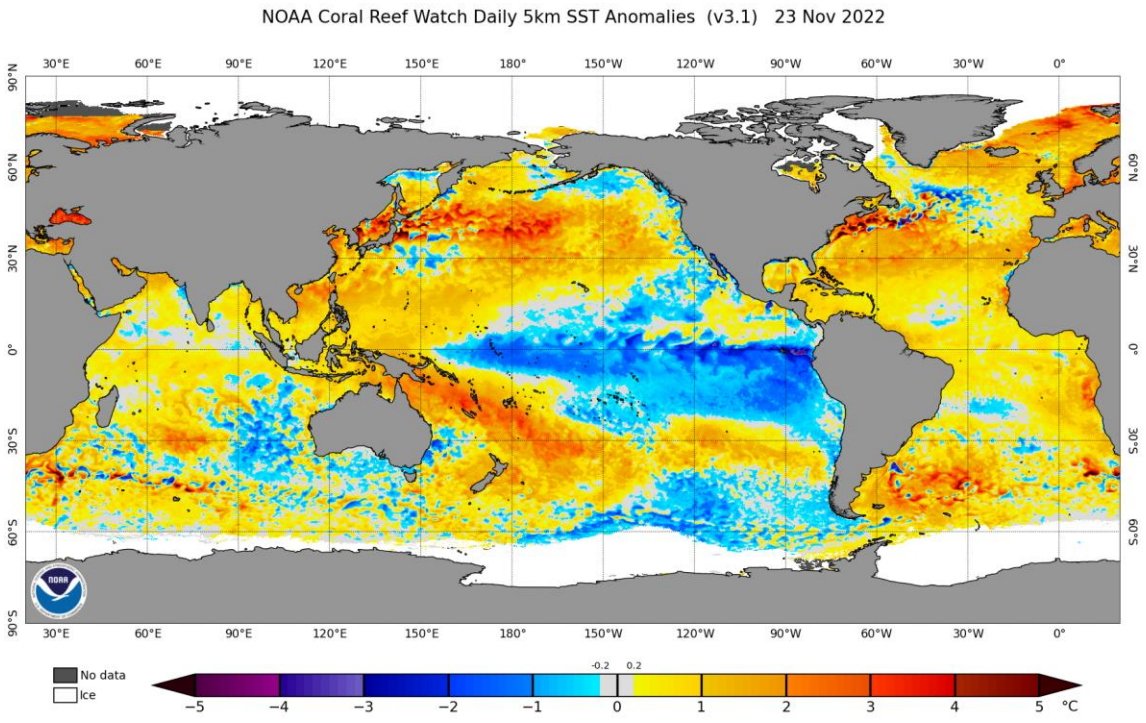
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Forecast

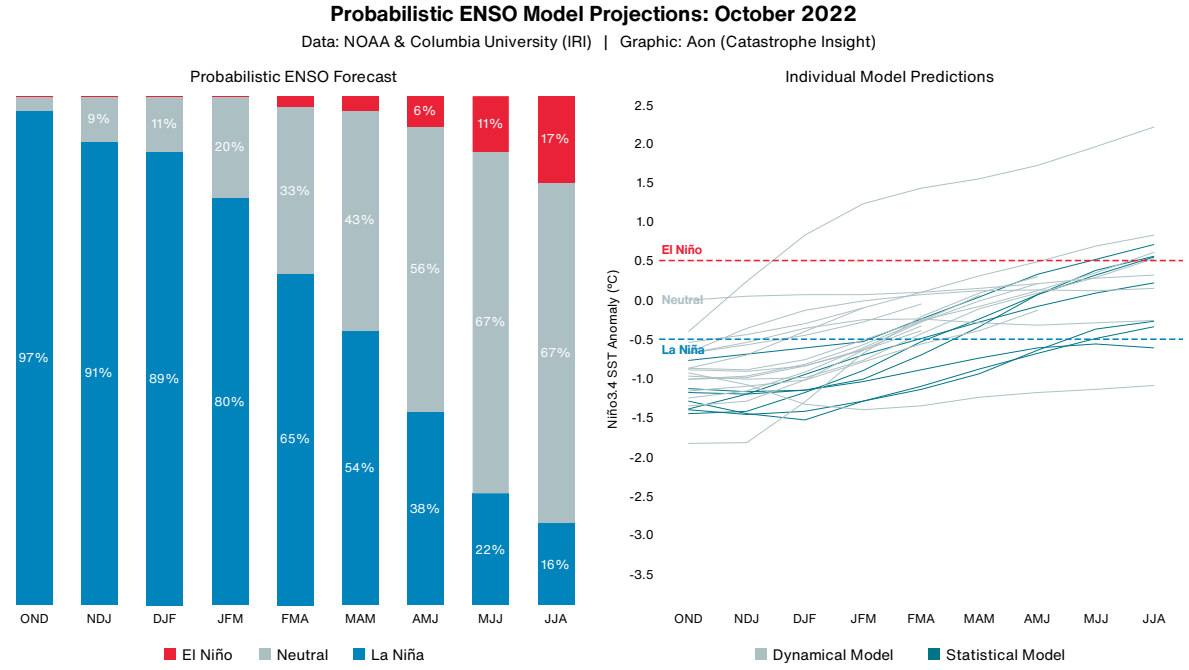


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

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



El Niño-Southern Oscillation (ENSO)



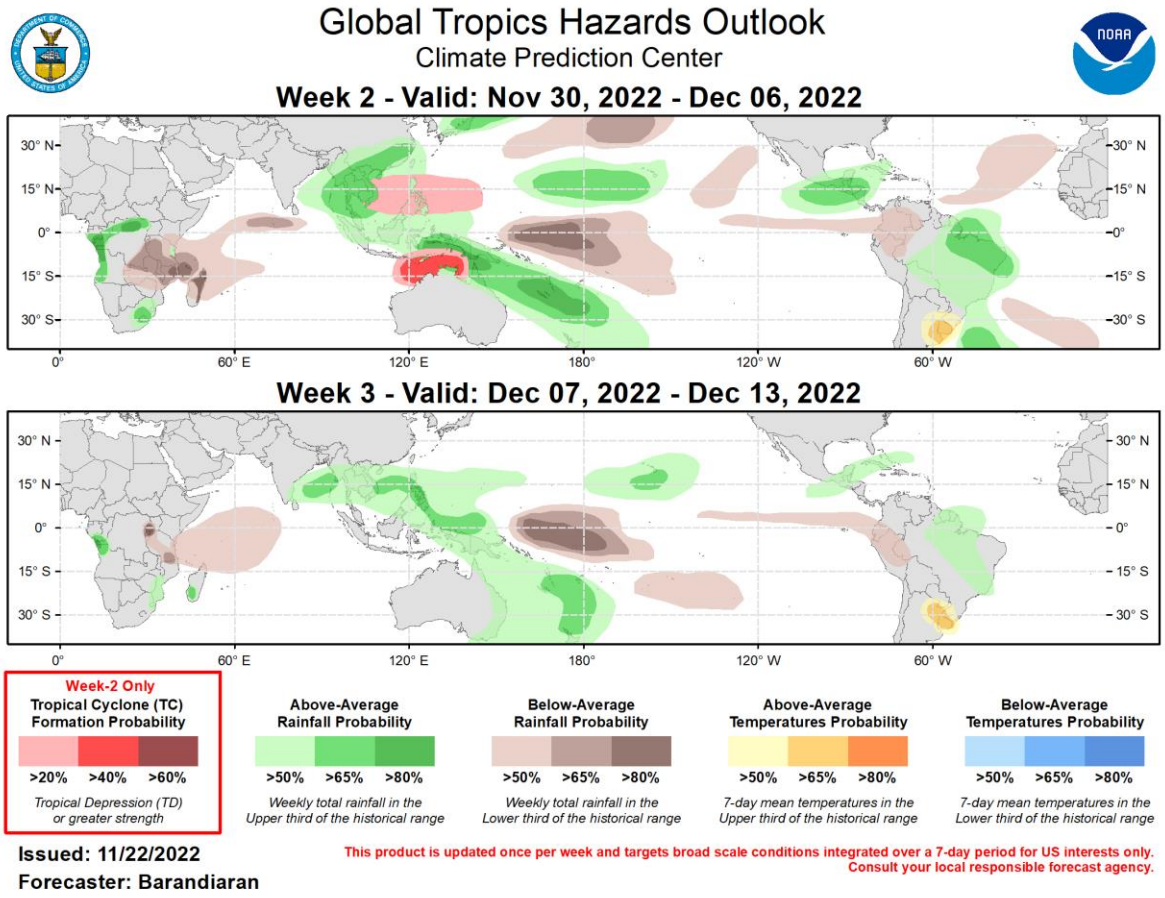
El Niño: *Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.*

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.*

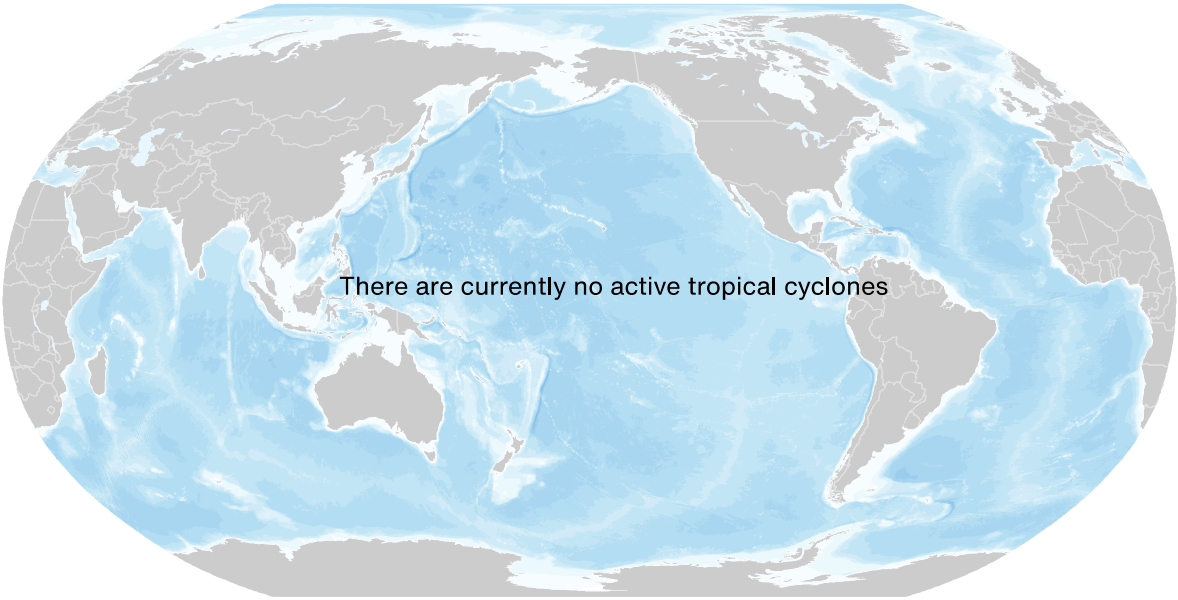
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

Global Tropics Outlook



Source: Climate Prediction Center (NOAA)

Current Tropical Cyclone Activity



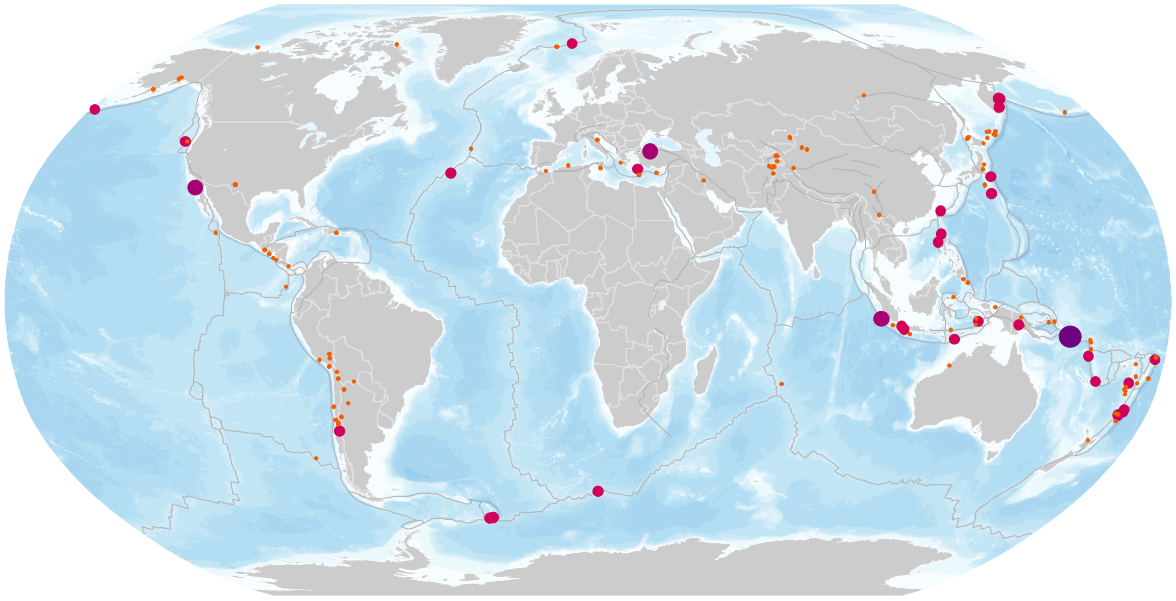
Tropical Depression Tropical Storm Category 1 Category 2 Category 3 Category 4 Category 5

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)

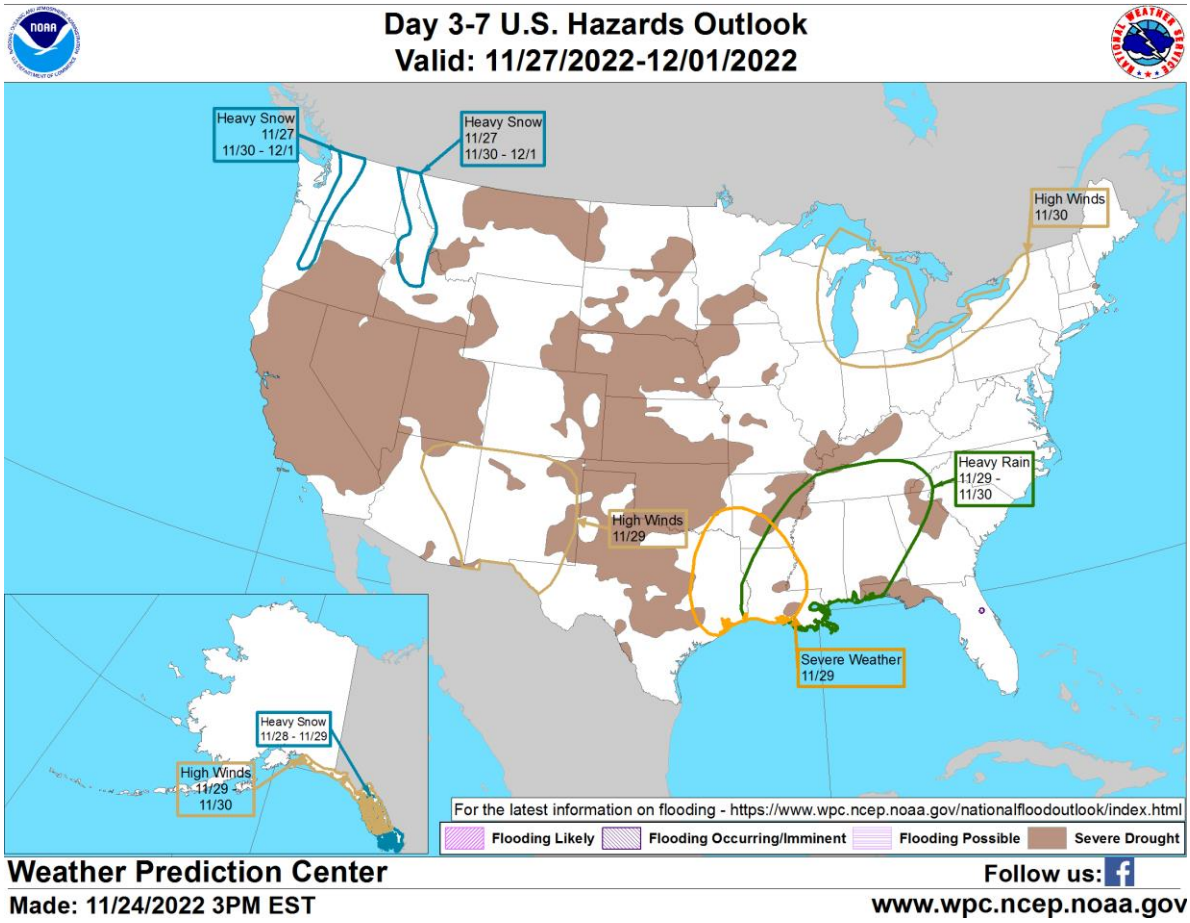
Global Earthquake Activity (≥M4.0): Nov 18 – Nov 24



Date (UTC)	Location	Magnitude	Epicenter
11/18/2022	4.89S, 100.80E	6.9	20 km (12 mi) SW of Bengkulu, Indonesia
11/22/2022	9.81S, 159.59E	7.0	19 km (12 mi) SW of Malango, Solomon Islands
11/22/2022	9.89S, 159.48E	6.0	33 km (21 mi) SW of Malango, Solomon Islands
11/22/2022	30.78N, 116.39W	6.2	29 km (18 mi) SW of Las Brisas, Mexico
11/23/2022	40.85N, 30.97E	6.1	16 km (10 mi) W of Düzce, Turkey

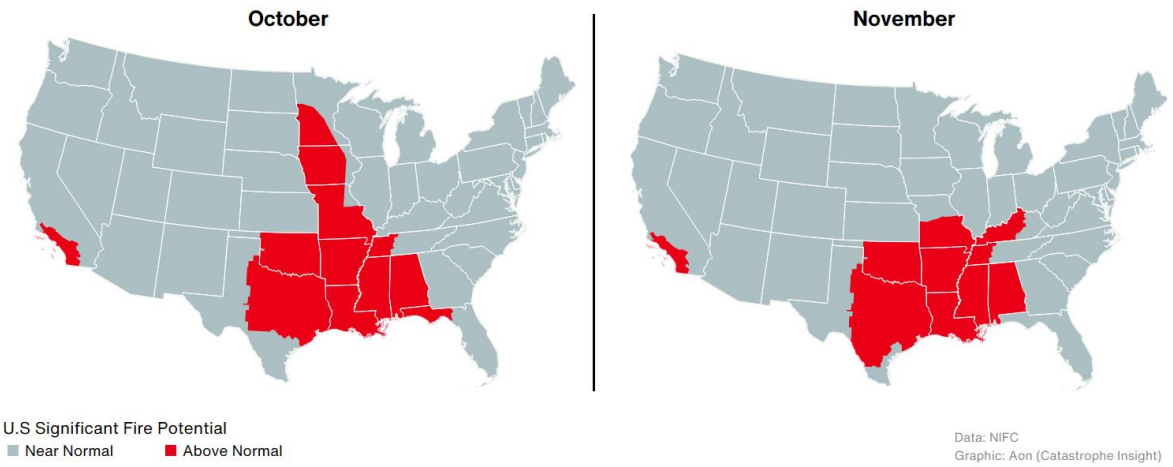
Source: United States Geological Survey

U.S. Hazard Outlook



Source: Climate Prediction Center (NOAA)

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



Annual YTD Wildfire Comparison: November 22

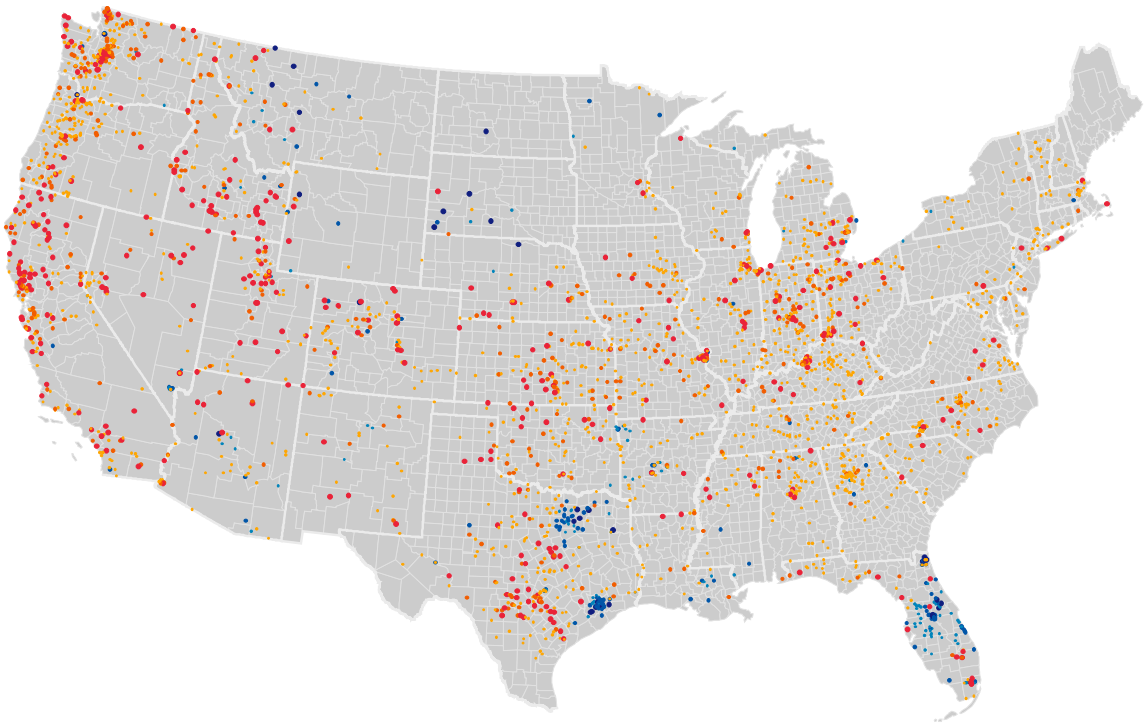
Year	Number of Fires	Acres Burned	Acres Burned Per Fire
2018	51,898	8,512,844	164
2019	45,959	4,602,023	100
2020	50,012	8,755,129	175
2021	49,752	6,546,939	132
2022	61,390	7,251,835	118
10-Year Average (2012-2021)	52,007	6,859,200	132

Top 5 Most Acres Burned by State: November 22

State	Number of Fires	Acres Burned	Acres Burned Per Fire
Alaska	595	3,110,976	5,229
New Mexico	733	858,809	1,172
Texas	11,217	666,594	59
Oregon	1,958	445,343	227
Idaho	1,045	401,143	384

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.

Source: United States Geological Survey

Source Information

Indonesia: Earthquake

United States Geological Survey (USGS)
Indonesia's Disaster Mitigation Agency (BNPB)
Maipark

Turkey: Earthquake

United States Geological Survey (USGS)
Minister Institution: 71 buildings to be demolished immediately. Anadolu

United States: Winter Weather

U.S. National Oceanic and Atmospheric Administration (NOAA)
National Weather Service
Historic snowstorm drops over 80 inches in Buffalo area as western New York digs out, *Fox Weather*
Buffalo, N.Y., braces for another wallop of lake-effect snow as storms continue, *CBC News*

Natural Catastrophes: In Brief

European Severe Weather Database (ESWD)
United States Geological Survey (USGS)
Rwanda and DRC- Over 40 Killed in Floods and Landslides, *Floodlist*
Floods Cause Six Deaths in Montenegro, Albania, Serbia, *Balkan Insight*
Panama's National Civil Protection System (SINAPROC)

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