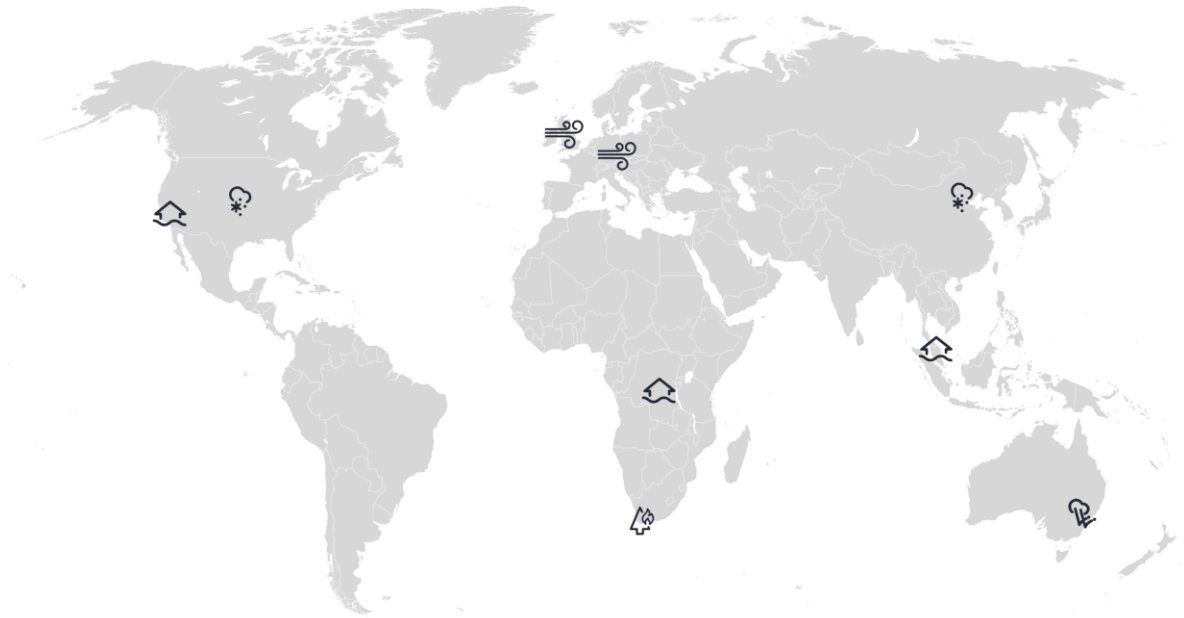


Weekly Cat Report

December 29, 2023



Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (\$)	Page
Windstorm Zoltan / Pia & Flooding	Europe	5	100s of millions	3
Flooding	United States	1	10s of millions	5
Severe Convective Storm	Australia	10	10s of millions	6
Flooding & Landslide	DRC	62	Unknown	7
Flooding	Thailand, Malaysia	8	Millions	7
Wildfire	South Africa	0	Unknown	7
Winter Weather	United States	1	Negligible	7
Winter Weather	China	0	Unknown	7
Windstorm Gerrit / Bodo	Northwestern Europe	0	Millions	7

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>

Europe: Windstorm Zoltan / Pia & Flooding

Overview

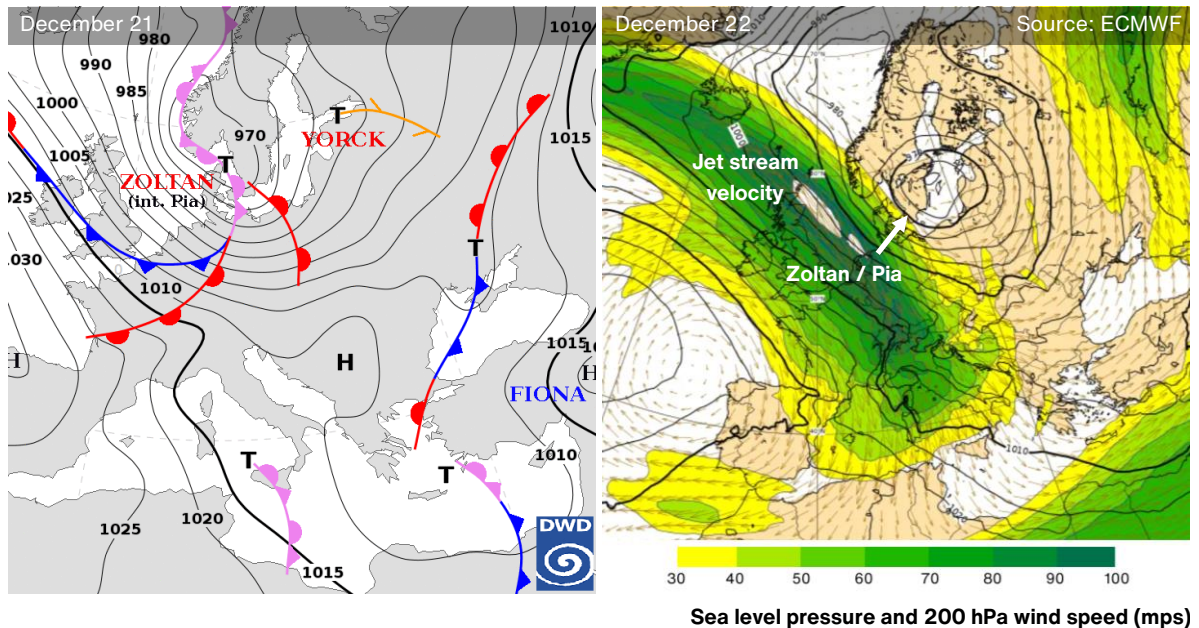
Windstorm Zoltan, internationally named Pia, brought intense winds and heavy precipitation into Western, Northern, and Central Europe between December 21-22. Additional heavy rainfall and snowfall were generated along a sharp frontal boundary associated with another low-pressure system, resulting in some flooding in several countries. Severe weather left several people dead and caused economic and insured losses in the hundreds of millions of EUR.

Meteorological Recap

Windstorm Zoltan / Pia on December 21-22

The system was originally named Pia by the Danish Meteorological Institute on December 20. An alternative name given by FU Berlin was Zoltan for this low. Zoltan approached Western Europe on December 21, bringing high wind gusts into large portions of the continent. Storm succession was powered by a very strong jet stream in the upper parts of the atmosphere, exceeding a speed of 100 mps (360 kph / 225 mph). The strongest wind gust of 185 kph (115 mph) near the surface was recorded at Cairn Gorm in Scotland, United Kingdom. However, many locations in Denmark, Germany, France, Austria, and other countries saw wind gusts over 100 kph (60 mph).

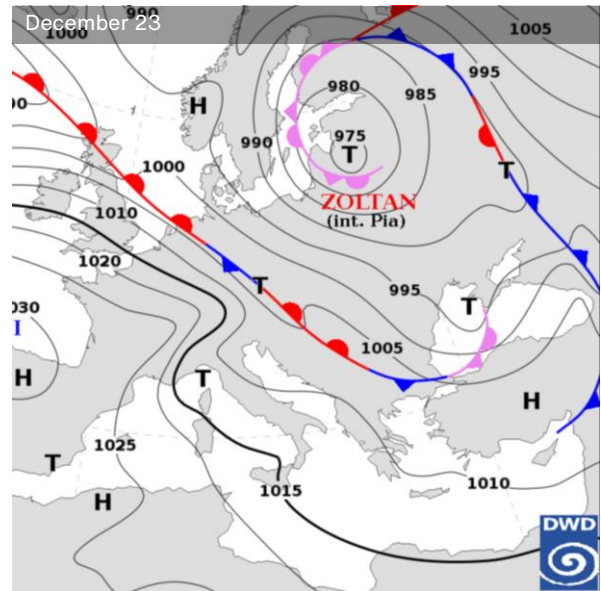
This weather pattern with a low-pressure system over northern Europe drove a milder westerly flow from the Atlantic. The successive fronts brought a significant amount of precipitation and rare winter thunderstorms over the continent.



Flooding on December 23-26

Following the wintry and rainy episode associated with low Zoltan, a sharp frontal boundary between colder airmass over Northeastern Europe and warmer air over Southwestern Europe developed, bringing additional intense precipitation along the frontal line. More rainfall and snowfall occurred due to the passage of another low-pressure system (named Abdul).

As a result, some locations saw event rainfall/snowfall totals between 100-200 mm (up to 7.9 inches). Torrential precipitation, strong winds, and mild weather in the warm sector enhanced rapid snowmelt, which all together resulted in flooding, particularly in Central Europe. Meteorological institutes across the affected area issued red or orange flood warnings.



Event Details

The windstorm resulted in widespread traffic disruptions across affected countries, including Germany and the Netherlands, and dozens of flights were canceled in the United Kingdom. Strong wind gusts downed trees and cut powerlines. In the UK, at least 40,000 customers experienced power outages as the storm passed. Tens of thousands of people lost power also in Austria and Slovakia. In Denmark, more than 300 weather-related interventions were carried out. Fire brigades in the Czech Republic intervened more than 3,700 times between December 24-26, particularly due to multiple flood events and downed trees that fell due to heavy snowfall and strong winds. Some vehicular damage was reported due to falling trees.

Although some rivers, including the Elbe or Danube, reached relatively high water levels, usually up to equivalent to 1-in-10-year flooding, floods did not cause significant damage. Several bigger cities used flood barriers preventively to avoid material losses.

In total, five windstorm-related fatalities were reported – one death in Denmark, Austria, Belgium, the Netherlands, and Czechia. Several others were injured.

Financial Loss

Impacts generated by Zoltan (Pia) were moderate and total economic and insured losses from the event are likely to reach into the hundreds of millions EUR. It will thus become the second-highest wind-related insured loss event in Europe in 2023 (after Ciarán). The highest wind-related impact was observed throughout Germany, while additional losses were also registered in neighboring countries, including Denmark, France, and Austria. Minor losses were also reported elsewhere due to flooding.

United States: Flooding

Overview

A prolonged period of heavy rain stemming from a large low-pressure system brought flooding impacts to California on December 20-22. Extreme rainfall rates particularly affected Santa Barbara and Ventura counties, leading to flooded homes, damaged roads, and 1 death. Material losses could potentially reach into the tens of millions USD.

Meteorological Recap

Beginning on December 16, brief periods of heavy rain fell across much of California due to a slow-moving, offshore low-pressure system. As the system progressed further east, steady bands of heavier precipitation began setting up over many coastal counties by late December 20. Widespread rainfall totals of 2-5 inches (50-130 mm) through December 22 were measured from San Francisco to San Diego while some higher elevations even exceeded 1 foot (300 mm) of rain.

Notably, parts of Santa Barbara and Ventura counties in southern California experienced historic rainfall rates early on December 21. In fact, the town of Oxnard received 3.18 inches (80 mm) of rain in under one hour, according to the NWS. This easily exceeded their December average rainfall total of 2.56 inches (65 mm).



Event Details

Ventura and Santa Barbara counties were especially impacted by flooding, including the towns of Oxnard, Port Hueneme, and Santa Barbara. Many homes, buildings, and roads were flooded, which led to some water rescues and evacuations. Minor flooding was also seen across multiple other California cities, including San Francisco, Malibu, and San Diego. One person was killed in a vehicle accident after hydroplaning in Los Angeles County. Due to the overall flooding impacts in California, economic and insured losses could reach into the tens of millions USD.

Location	72-Hour Rain Total (in/mm)
Santa Barbara, CA	6.12 / 155.4
Ventura, CA	5.32 / 135.1
Oxnard, CA	4.79 / 121.7
Thousand Oaks, CA	4.11 / 104.4
San Francisco, CA	3.01 / 76.5

72-hour rain totals as of the afternoon of December 21

Source: The Washington Post

Australia: Severe Convective Storm

Overview

Persistent severe weather wreaked havoc in eastern Australia on December 23-26. Victoria, New South Wales, and Queensland experienced widespread hailstorms, damaging winds, flash floods, and a few tornadoes. 10 people were killed, at least 700 homes were damaged, and over 120,000 people lost power. Total economic and insured losses could reach into the tens of millions USD.

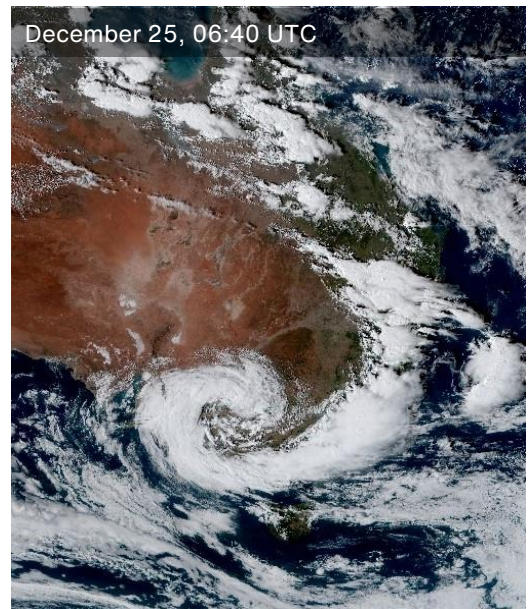
Meteorological Recap

Within the eastern regions of Queensland, New South Wales (NSW), and Victoria, dozens of communities were hit hard by severe weather on December 23-26. Powerful storms packed with heavy rain, strong winds, tornadoes, and hail over 6 cm (2.4 inches) in diameter impacted a large area spanning from Brisbane to Melbourne. Much of the heavy rainfall, particularly in NSW, fell within a very short period. In fact, Eurobodalla in NSW received 156 mm (6.14 inches) in just 3 hours.

Event Details

In total, 10 were killed and more than 120,000 people lost power across Queensland, NSW, and Victoria. The storms caused widespread downed trees and power lines and damaged at least 700 homes. This prompted the Insurance Council of Australia (ICA) to declare a 'Significant Event' for all three Australian states.

In NWS, large hail caused significant damage to numerous buildings and vehicles within the towns of Rutherford, Maitland, and Aberglasslyn. More hail damage and even livestock deaths occurred near the towns of Grenfeld and Orange. The NSW State Emergency Service (SES) responded to over 800 severe weather incidents on December 24-25, including over 300 from the Sydney metro area alone. Notably, the regions of Scenic Rim and Gold Coast City were heavily damaged by strong winds and a few tornadoes.



Flooding in Kensington, NSW

Source: NSW SES

Financial Loss

As of December 28, insurers received more than 7,500 claims related to the storms across the affected states. The number of claims is expected to increase in the coming days as the impacts of the event become more apparent. Total economic and insured losses could reach into the tens of millions USD.

Natural Catastrophes: In Brief

Flooding & Landslide (Democratic Republic of the Congo)

Torrential rains from December 25-27 triggered severe flooding and landslides in the Kasai-Central and South-Kivu provinces within the Democratic Republic of the Congo. According to authorities, 22 people were killed in Kasai-Central while another 40 people were killed in South-Kivu. The communes of Kananga, Bukavu, and Burhinyi were among the hardest hit with notable infrastructural damage.

Flooding (Thailand, Malaysia)

Widespread flooding left at least six people dead in southern Thailand between December 22 and 25. More than 66,000 people were affected across the provinces of Satun, Songkhla, Pattani, Yala, and Narathiwat. Floodwaters inundated dozens of houses and caused notable traffic disruptions in the region. More than 28,000 people were evacuated due to widespread flooding in the Malay Peninsula, especially in the Johor, Kelantan, Pahang, Sabah, and Terengganu states. At least 2 people were killed.

Wildfire (South Africa)

An approaching fire has prompted evacuations for hundreds of people in Simon's Town, near Cape Town, in southwestern South Africa since December 19. At least five people were injured during the operations, and more than 1,100 hectares (2,700 acres) of land have been already burned.

Winter Weather (United States)

On December 25-26, a strong winter storm impacted much of the northern Great Plains and upper Midwest. Heavy snow, strong winds, and icy conditions led to numerous canceled flights and vehicle crashes, which resulted in at least 1 death and 3 injuries.

Winter Weather (China)

Northeastern China has experienced a prolonged period of cold weather. Beijing, China's capital, has recorded its longest cold wave since 1951, with more than 300 hours of sub-zero temperatures since December 11. The cold wave has caused disruptions to the city's metro system, leading to traffic collisions and hundreds of injured people. Some areas have experienced temperatures plunging below -40 °C (-40 °F). The extreme temperatures complicate rescue efforts following a deadly earthquake that occurred earlier in the month in northwest Gansu province.

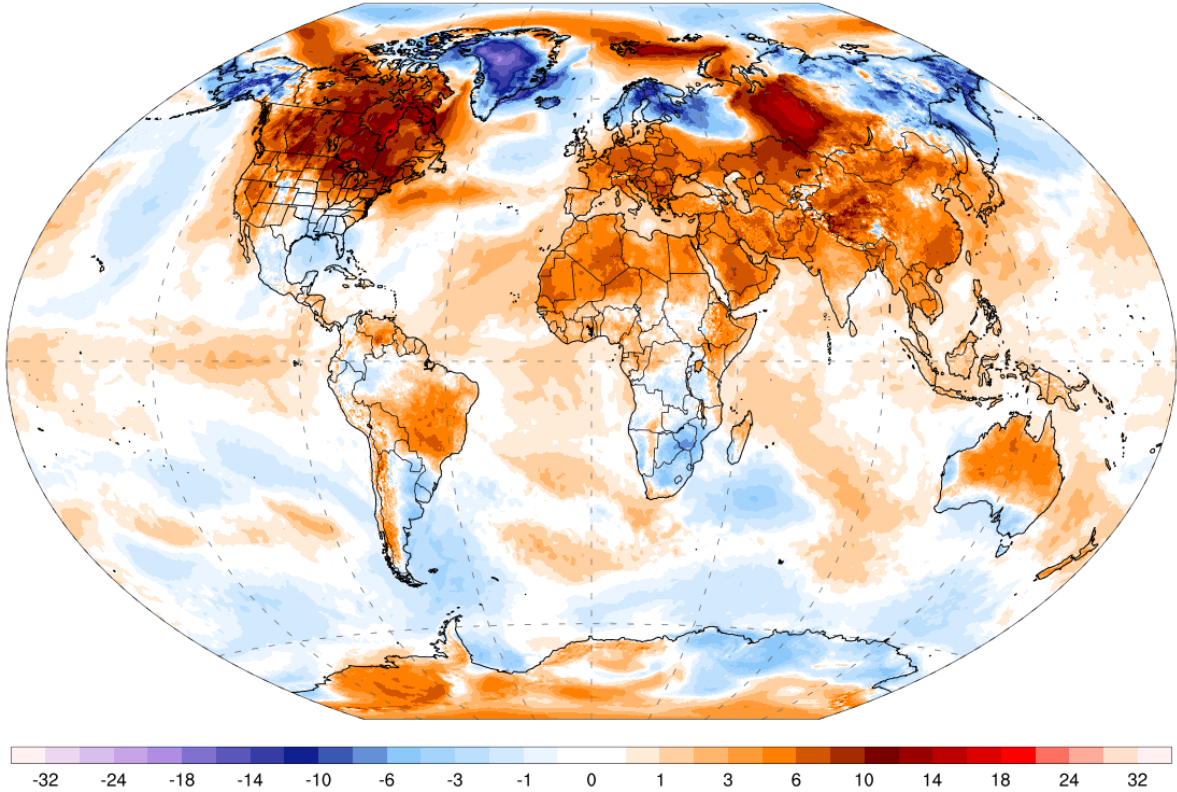
Windstorm Gerrit / Bodo (Northwestern Europe)

On December 26-28, another low named Gerrit (alternatively Bodo) affected Northwestern Europe, particularly the United Kingdom, Ireland, and Norway. The storm generated high wind gusts that downed trees, cut powerlines, and caused widespread traffic disruptions. However, material losses related to this storm were relatively low.

Global Temperature Anomaly Forecast

GFS 2m T Anomaly (°C) [CFSR 1979-2000 baseline]
Days 1-3 Avg | Thu, Dec 28, 2023

ClimateReanalyzer.org
Climate Change Institute | University of Maine

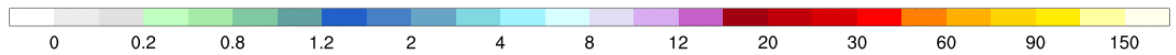
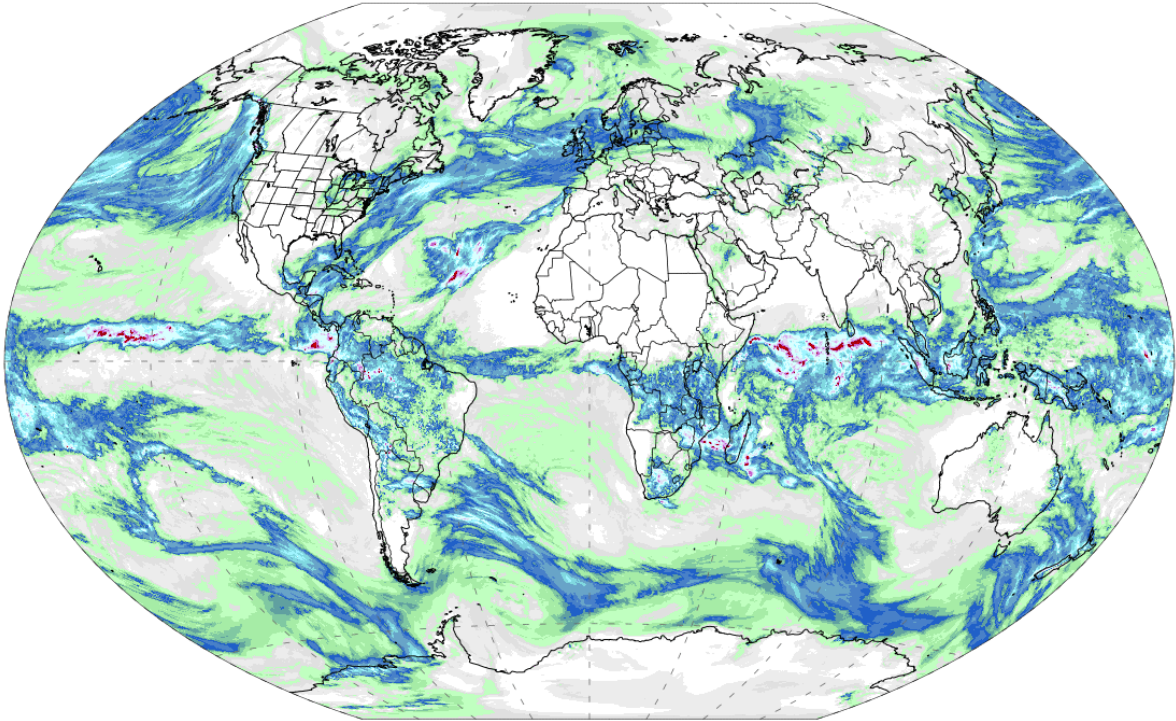


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Forecast

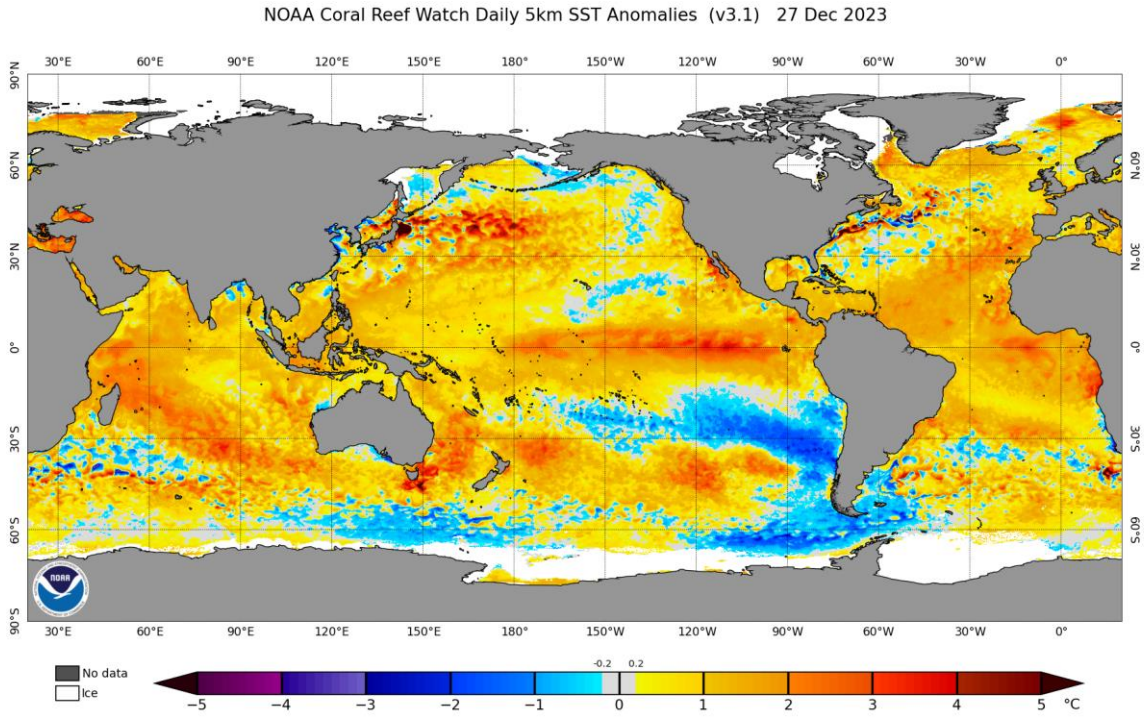
GFS Accumulated Precipitation (cm)
Days 1-3 Total | Thu, Dec 28, 2023

ClimateReanalyzer.org
Climate Change Institute | University of Maine

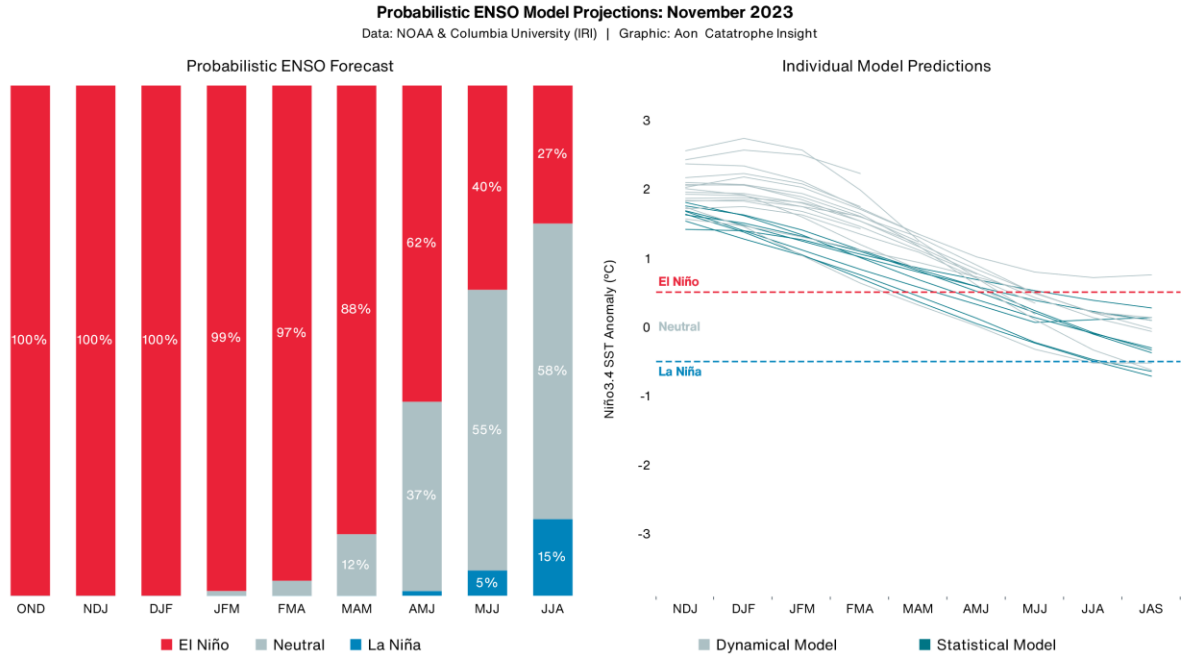


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

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



El Niño-Southern Oscillation (ENSO)



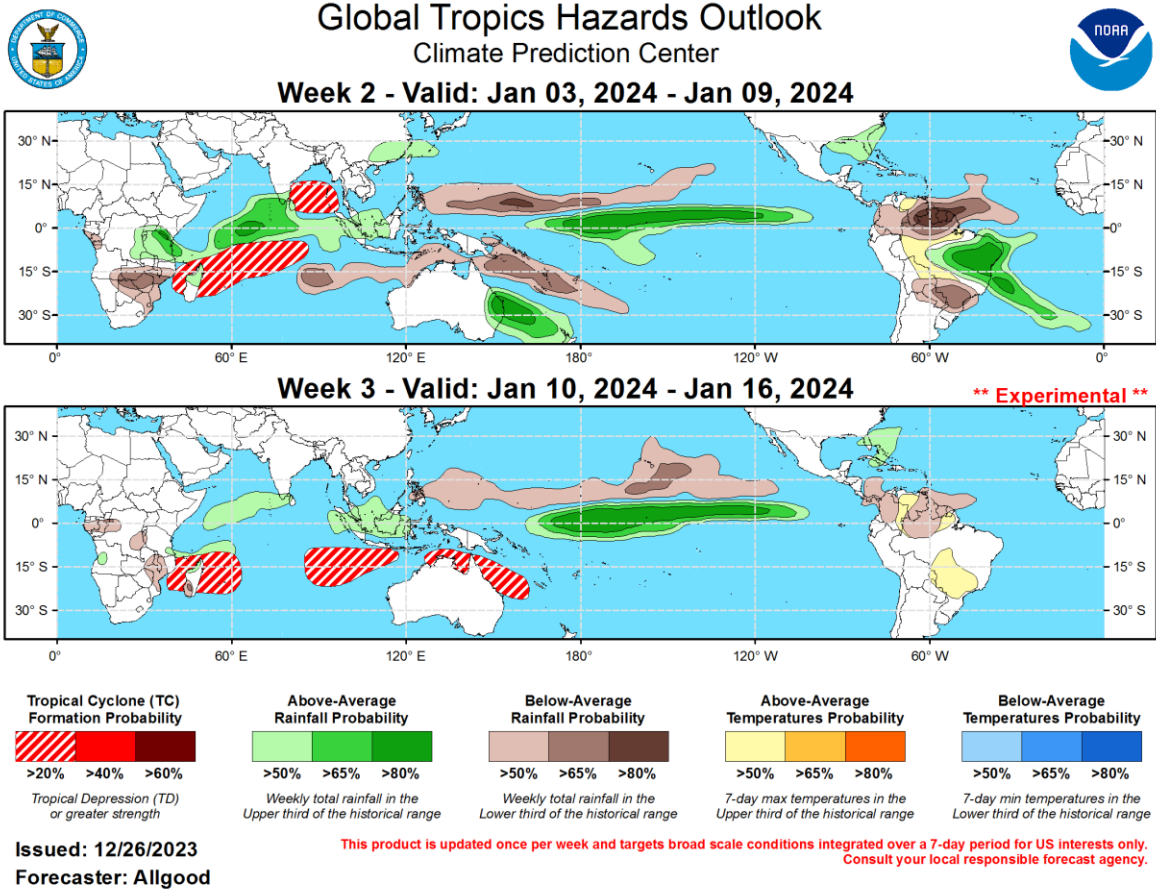
El Niño: Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.

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.

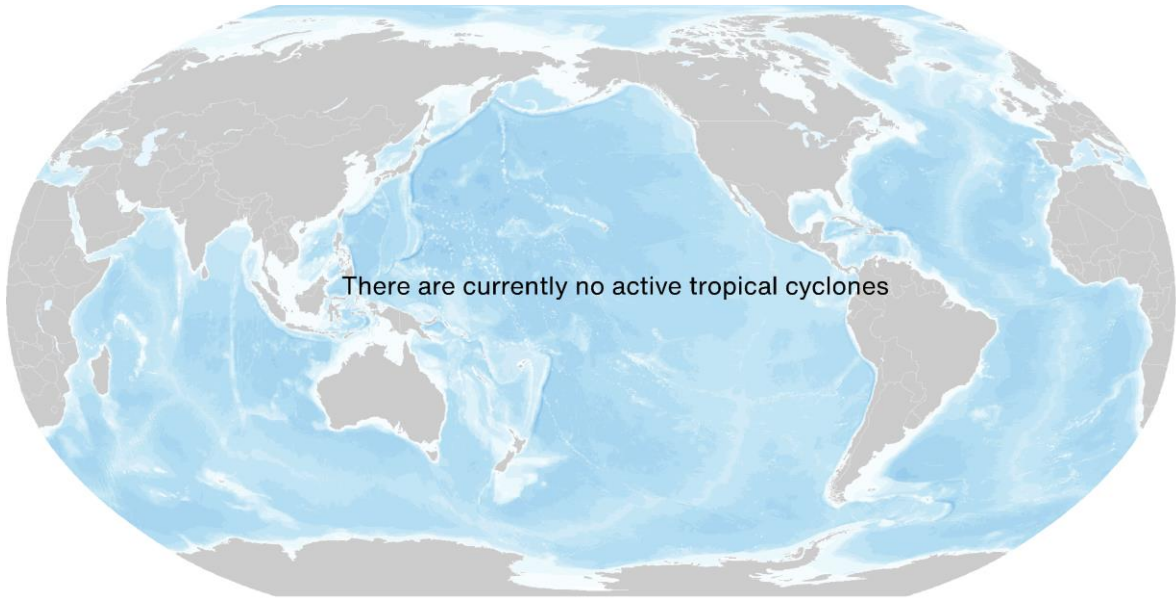
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

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

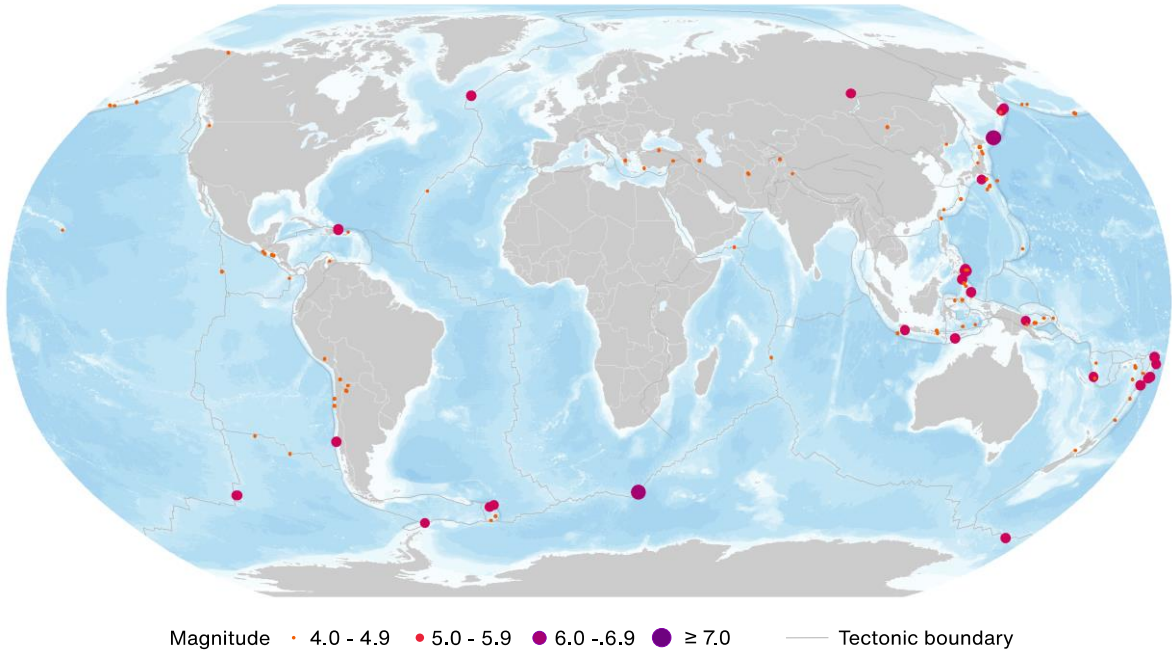
Name	Location	Winds	Center

* 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)

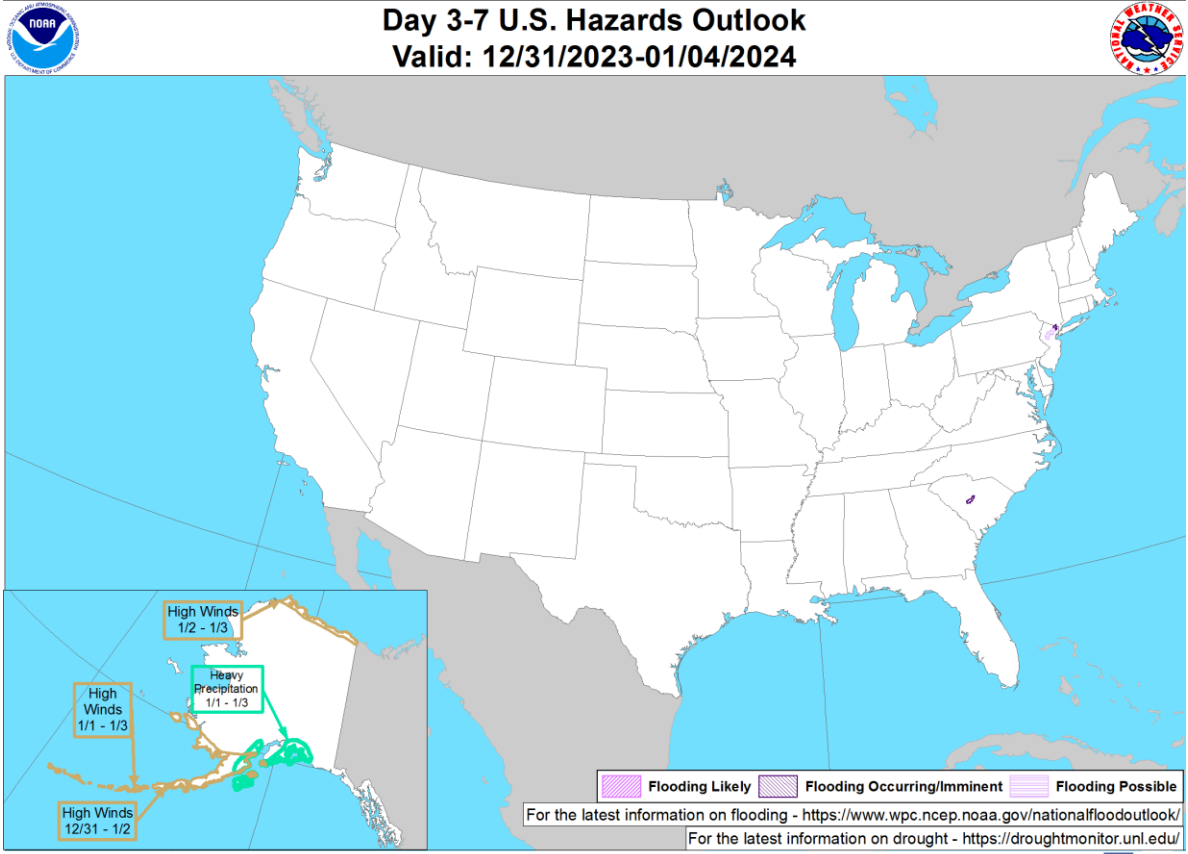
Global Earthquake Activity ($\geq M4.0$): December 22-28



Date (UTC)	Location	Mag	Epicenter
12/22/2023	52.09S, 27.94E	6.1	South of Africa
12/28/2023	44.58N, 148.99E	6.5	11 km (7 miles) SE of Kurilsk, Russia

Source: United States Geological Survey

U.S. Hazard Outlook

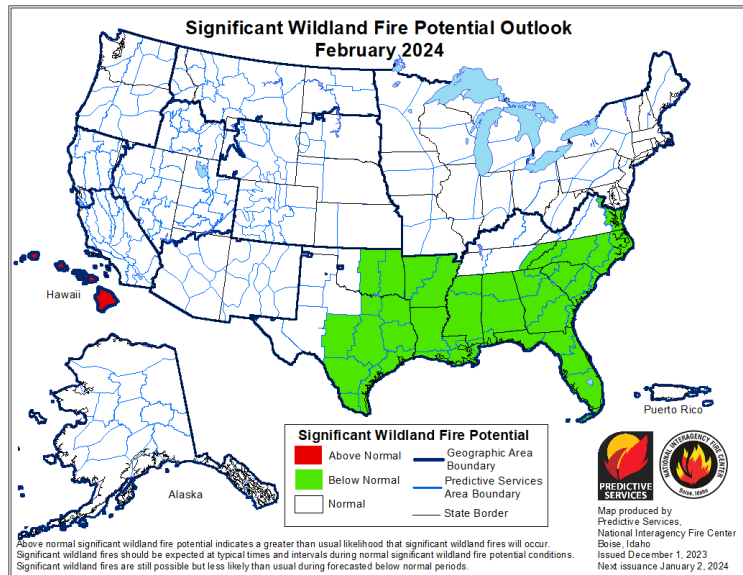
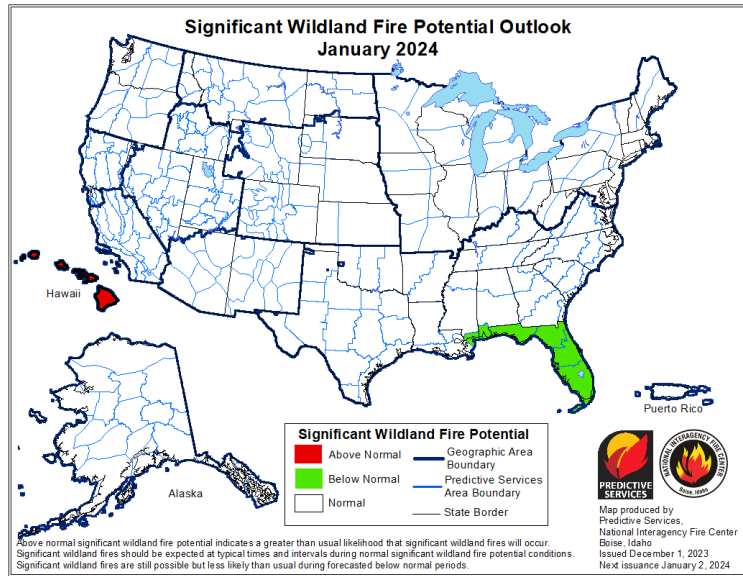


Weather Prediction Center
Made: 12/28/2023 02:44 PM EST

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

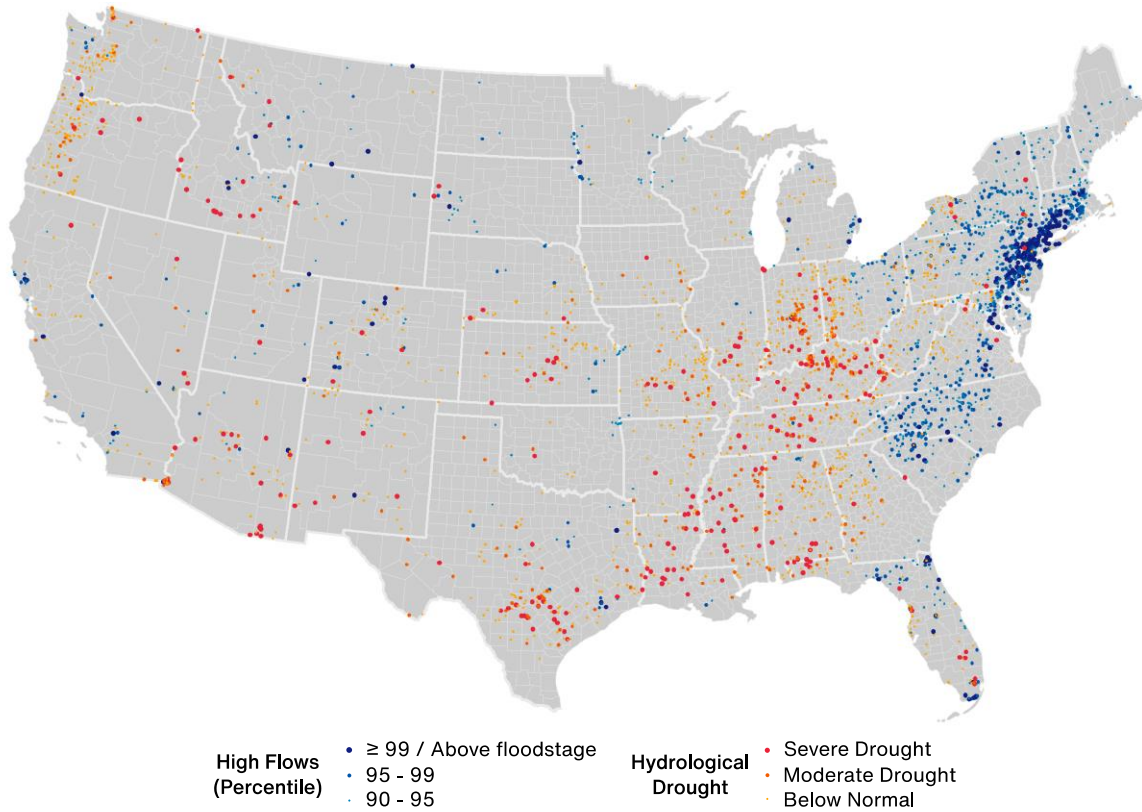
Source: Climate Prediction Center (NOAA)

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



Source: NIFC

U.S. Current Riverine Flood Risk



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

Northwestern & Central Europe: Windstorm Zoltan / Pia

ESWD
ECMWF

United States: Flooding

National Weather Service (NWS)

California hammered with rain and flooding ahead of holiday weekend: Latest, *ABC News*

Flooding rains in California disrupt travel, with more to come, *The Washington Post*

Evacuations, warnings to stay off Oxnard roads after storm flooding, *Ventura County Star*

A driver dies after his vehicle hydroplaned amid heavy rain in Los Angeles area, *Erie News Now*

Australia: Severe Convective Storm

NOAA

New South Wales State Emergency Service (NSW SES)

The Insurance Council of Australia (ICA)

The Bureau of Meteorology (BoM)

New South Wales deals with severe weather after weekend of flash flooding, heavy rain and giant hail, *ABC News*

Two people killed with more severe weather on the way as storms batter east coast, *SBS News*

Natural Catastrophes: In Brief

Torrential rains kill at least 22 in Congo's Kasai region, *Reuters*

Six dead, tens of thousands hit by southern Thailand flooding, *Channel News Asia*

Weather Prediction Center (WPC)

Ice storms and blizzards pummel the central US a day after Christmas, *ABC News*

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