

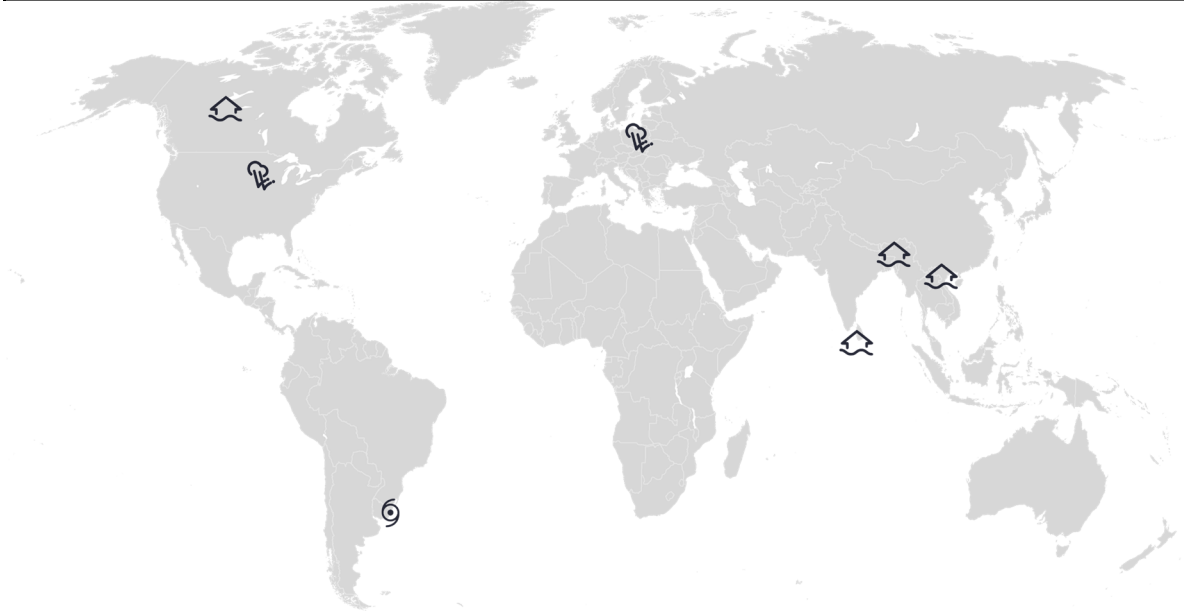
**AON**

# **Weekly Cat Report**

May 20, 2022



## Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (\$)	Page
<b>Severe Convective Storm</b>	United States	3+	100s of Millions	3
<b>Flooding</b>	Canada	0	Millions	8
<b>Flooding</b>	India, Bangladesh	16+	Millions	8
<b>Flooding</b>	Vietnam, Thailand	9+	Unknown	8
<b>Severe Convective Storm</b>	Europe	0	Millions	9
<b>Flooding</b>	Sri Lanka	0	Unknown	9
<b>Cyclone Yakecan</b>	Uruguay, Brazil	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>

## United States: Severe Convective Storm

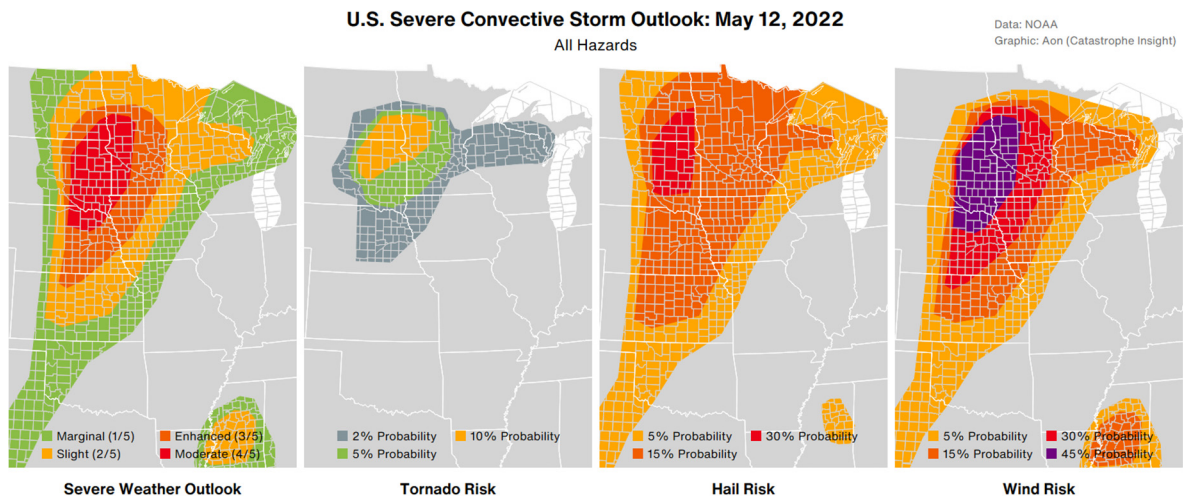
### Overview

A long-lived derecho traversed portions of the Upper Midwest and Northern Plains on May 12, generating widespread reports of exceptional straight-line wind damage, large hail, and isolated tornadoes along a swath spanning at least 500 mi (805 km) from Nebraska into Minnesota. Three fatalities and multiple injuries were reported. Slow moving frontal systems and upper-level disturbances continued to produce instances of severe weather across the Plains, Mississippi Valley, and Northeast through May 17. During this period, large hail resulted in a swath of damage across populated regions south and east of Washington D.C. on May 16. Total economic and insured losses were each individually expected to reach well into the hundreds of millions (USD).

### Meteorological Recap

May 12

A particularly bad situation unfolded across the Northern Plains and Upper Midwest as a considerable contrast between cooler temperatures in the West and near to record breaking warmth in the Plains aided in the rapid formation of a low-pressure area and associated frontal system which swept through the region on May 12.



A **Moderate Risk** (level 4 out of 5) for severe weather was forecast in parts of northeast Nebraska, eastern South Dakota, southern North Dakota, and western Minnesota on May 12, surrounded by a broader **Enhanced Risk** (level 3 out of 5) - in total these regions encompassed no fewer than 6.5 million people. The environment near and south of a strong warm front lifting through the area was characterized by rapid destabilization and very high Convective Available Potential Energy or CAPE (which is directly related to the updraft strength in a thunderstorm) aided by abundant surface heating. The initial line of severe storms, which began in Nebraska, were further enhanced by favorable wind shear (change in wind speed and/or direction with height) and increasing mid-level lapse rates (changes in temperature with height).

As the line of storms evolved, the SPC issued a rare **Particularly Dangerous Situation (PDS)** Severe Thunderstorm Watch at 3:25 PM (local time) on May 12 as the dangerous squall line progressed from Nebraska into South Dakota and Minnesota. The watch warned of a prolific windstorm with the potential for significant gusts reaching 105 mph (170 kph) in addition to large hail and isolated tornadoes.

The well-organized squall line or **derecho**, defined as a widespread, long-lived windstorm associated with a band of swiftly moving thunderstorms, went on the produce at least 64 preliminary reports of hurricane force non-tornadic wind gusts of 75 mph (120 kph) or higher – tied for the most in a single day since records began in 2004. Several stations in South Dakota and Minnesota recorded wind gusts exceeding 90 to 100 mph (145 to 160 kph). Embedded rotation within the squall line generated confirmed tornadoes. The derecho and additional SCS, which developed further north in the vicinity of the warm front, produced reports of large hail, 2.0 in (5.1 cm) or greater.

### May 13-15

Additional instances of scattered and localized severe weather spanned the Southern Plains and middle Mississippi Valley on May 13-14 as the cold front, which aided in the May 12 derecho, gradually meandered through the region. Supercells which produced large hail, 2.0 in (5.1 cm) or greater, traversed southwest Kansas and northwest Oklahoma on May 14.

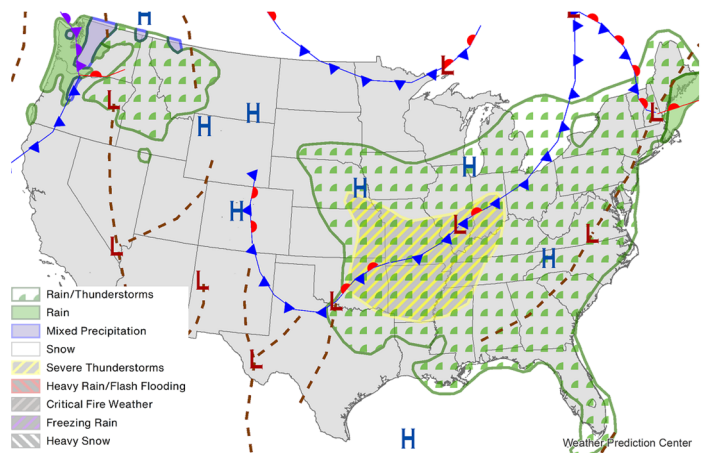
A more substantial severe outbreak unfolded in the Southern Plains and Lower Mississippi Valley on May 15 as a trailing cold front and midlevel short-wave trough moved toward the area. An

**Enhanced Risk** (level 3 out of 5) for severe weather was issued by the SPC in eastern Oklahoma, southeast Kansas, northern Arkansas, and southern Missouri. Clusters of storms rapidly organizing into a well-defined convective line resulted in widespread reports of damaging straight-line winds from Kansas, through central Arkansas, and into western Mississippi. Elsewhere, discrete storms propagating southward along an outflow boundary generated large hail in southern Oklahoma and northeast Texas. Baseball to softball size and larger hailstones were reported in Okfuskee County in Oklahoma.

### May 16-17

As the pattern progressed eastward on May 16, and **Enhanced Risk** (level 3 out of 5) for SCS was delineated across a region of the Northeast and Mid-Atlantic. Damaging wind gusts and large hail were the primary hazards as storms ignited ahead and along an approaching cold front. A well-developed supercell resulted in notable impacts in portions of northern Virginia and southern Maryland and Delaware – and including portions of the D.C. Capital Metro. Several instances of damaging hail were observed.

Evolving bowing storm segments and a linear Mesoscale Convective System (MCS) generated strong winds and hail across the central Plains on May 17.

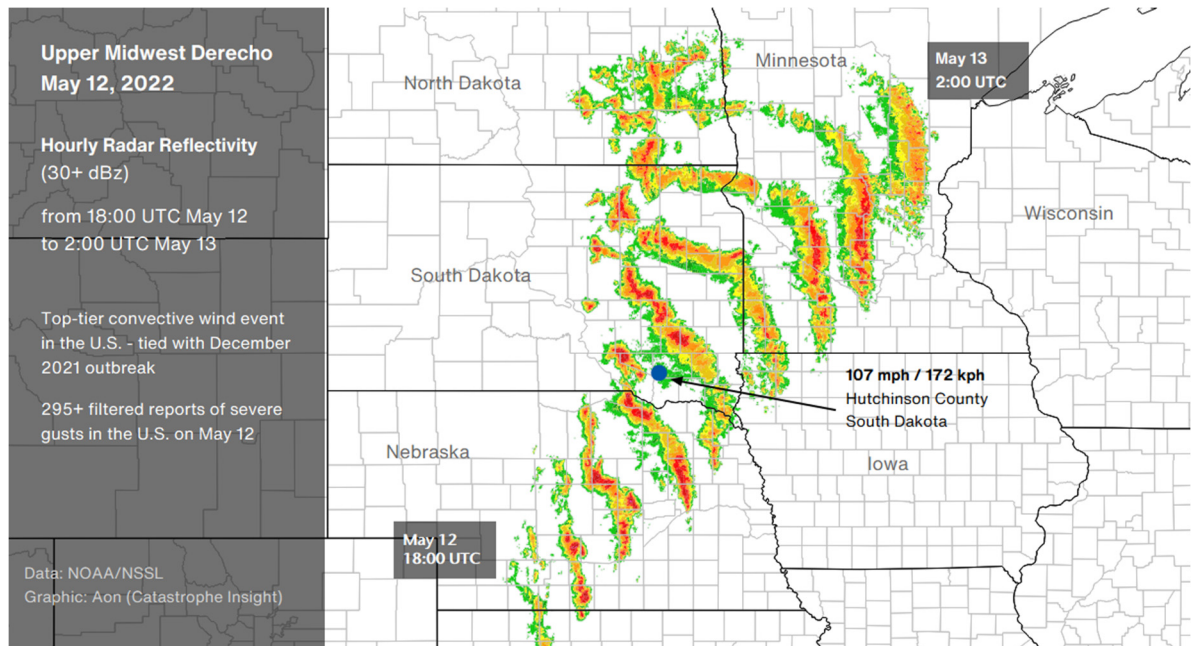


**U.S. surface weather analysis on May 15**  
Data: Weather Prediction Center

## Event Details

### May 12

The May 12 derecho ranked as top tier convective wind event in the United States in terms of reported gusts reaching and exceeding 75 mph (120 kph). The SPC began keeping reliable records of such statistics in 2004 – the top four events have all occurred within the past two years.

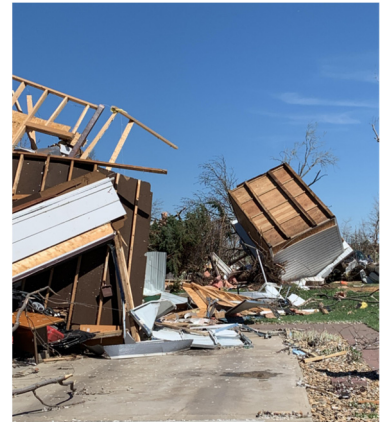


In the wake of the derecho, no fewer than 110,000 customers were without electricity, a majority of whom resided in South Dakota and Minnesota. Three fatalities related to the windstorm and accompanied SCS were confirmed. An incredible wall of dust, or haboob, picked up by the line of storms darkened skies and made travel nearly impossible as the event unfolded. As of this writing, the SPC had recounted 389 filtered reports of severe weather across the United States on May 12 alone, of which 295 were pertaining to severe winds. At least 17 tornadoes have been confirmed on May 12 across South Dakota, North Dakota, and Minnesota.

In **Nebraska**, non-tornadic wind gusts reaching and surpassing 80 mph (128 kph) were observed in Burt, Cedar, Dawson, Madison, Platte, Valley, and York Counties. An 89 mph (143 kph) gust was reported in Valley County near Ord. Significant wind damage was incurred at the **Garfield County** Fairgrounds in Burwell and included impacts to grandstands and roofs torn from structures. The dust storm which accompanied the derecho aided in an 11 vehicles accident in **Lincoln County**, which resulted in minor injuries. The storm prompted the temporary closure of sections of Route 30 and Interstate 80. In **Saline County**, hail reaching 2.5 in (6.4 cm) pelted localities near De Witt.

In **South Dakota**, extremely dangerous conditions evolved in southern and eastern portions of the state due to very high winds, dust, and multiple severe hazards. A remarkable convective wind gust of 107 mph (172 kph) was recorded in **Hutchinson County**, near Tripp, while reports of gusts 90 mph (145 kph) or greater were measured in Beadle, Lake, and Deuel Counties. The derecho snapped trees, downed utility lines, damaged homes and structures, and flipped vehicles along roadways. Two fatalities were confirmed in the state.

In **Hamlin County**, multiple buildings, including a school, sustained significant damage in the Town of Castlewood due to an EF2 tornado with wind speeds reaching 120 mph (193 kph). Additional impacts included structures blown from their foundation and collapsed external walls. In neighboring **Codington County**, damage was reported at the Watertown Airport and encompassed several impacted hangars. In **Deuel County**, a brief EF2 tornado resulted in one injury and generated extensive damage to a farm, a residence, and flipped a semi-truck.



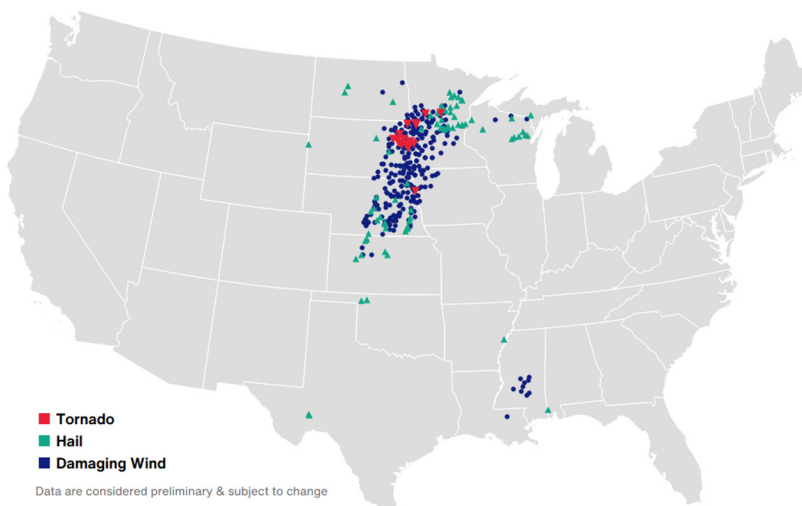
**Tornado damage in Castlewood, SD**  
Source: NWS-DAT

Elsewhere, **Sioux Falls** emergency officials issued travel warnings due to downed trees and utility lines throughout the metro region. As of this writing, at least 10 tornadoes have been confirmed in the state, and notable damages were assessed in no fewer than 28 counties. The Governor declared a State of Emergency in the wake of the derecho to further assist residences in need.

In **Minnesota**, the derecho generated widespread damage across regions of the state which were still recovering from previous bouts of SCS and large hail damage which occurred days prior. Non-tornadic wind gusts of 80 mph (128 kph) or higher were measured in Big Stone, Douglas, Lac Qui Parle, Lyon, Pipestone, and Wadena Counties. No fewer than 70,000 customers in Minnesota alone experienced power outages, thousands of which persisted for days.

In **Wadena County**, an EF2 tornado with maximum estimated wind speeds reaching 115 mph (185 kph) damaged multiple homes and vehicles along its 16 mi (26 km) path through parts of Verndale and Blue Grass - impacts further included steel roofing torn from industrial buildings. Furthermore, a gust of 94 mph (151 kph) was measured near Verndale. A second EF2 tornado in **Wilkin County**, near Campbell, snapped dozens of power poles while fallen trees impacted homes and structures in its path. In **Kandiyohi County**, widespread straight-line wind damage was surveyed near Wilmar and included several impacted farms and notable tree damage.

Additional instances of damage from severe straight-line winds were observed in **Kansas, Iowa, and North Dakota**.

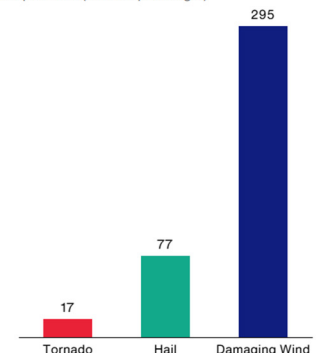


### United States Local Storm Reports (LSRs)

May 12

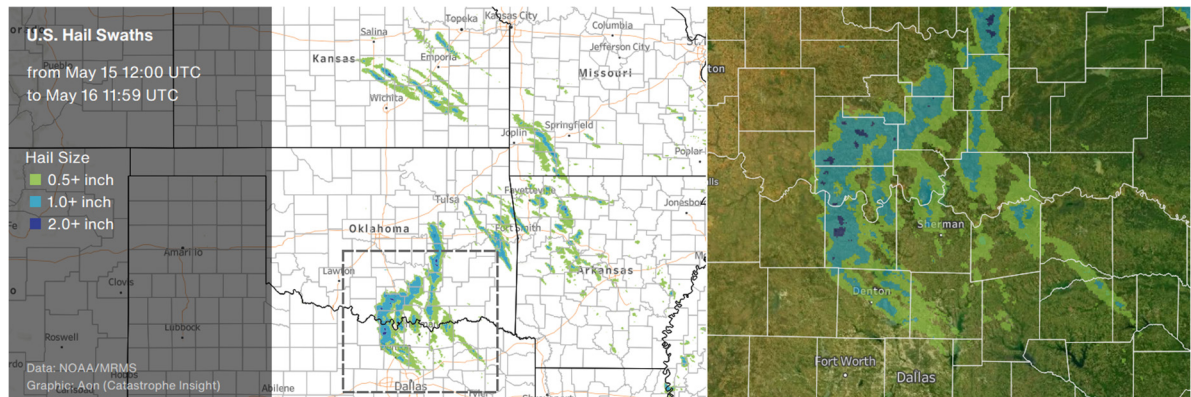
Data: NOAA

Graphic: Aon (Catastrophe Insight)



May 13-15

On May 13, hail 2.0 in (5.1 cm) or larger were reported in localized regions of central **Oklahoma** and **Texas**. On May 15, a line of storms producing non-tornadic wind damages left at least 52,000 customers in central **Arkansas** without electricity. Downed trees impacted homes and vehicles and resulted in no fewer than two injuries. In **Oklahoma**, hail greater than or equal to 2.0 in (5.1 cm) fell in parts of Cherokee, Hughes, Johnston, Muskogee, Okfuskee, Pontotoc, and Sequoyah Counties. Grapefruit size hail, reaching 4.5 in (11.4 cm) was measured in Okfuskee County near Okemah, while hailstones larger than a baseball were observed near Clearview.



May 16-17

On May 16, no fewer than 40,000 customers in **Virginia** and **Maryland** alone were without power, mainly following a robust supercell which traversed the region. The cell produced multiple instances of hail damages to trees, siding, windows, roofs, and vehicles – particularly in parts of southern **Maryland**. Hail reaching 3.0 in (7.6 cm) were confirmed in Calvert County, near Chesapeake Beach, while 2.0 in (5.1 cm) hail damaged homes in Dorchester County. Severe straight-line winds toppled trees and blew debris onto roadways.

On May 17, high winds downed trees and power poles, damaged roofs and shingles, and left thousands of customers without electricity in central **Kansas**. In Shawnee County, an 80 mph (128 kph) gust was recorded near Silver Lake.

On May 19, a severe storm which developed over densely populated regions of the Minneapolis-St. Paul metro region in **Minnesota** generated multiple reports of hail up to golf ball sized. Damage assessments were ongoing though initial reports suggested many homes were affected.

**As of this writing, severe weather was ongoing in parts of the Midwest and Middle Mississippi Valley on May 19. Additional updates will be provided in future weekly reports.**

## Financial Loss

Economic and insured losses from the May 12 derecho alone were each individually anticipated to reach into the hundreds of millions (USD). While extensive damage was incurred to property and infrastructure, agricultural losses were suppressed since it is too early to detail how much impact has been incurred to harvests. Additional non-negligible losses generated by severe hazards between May 13-17 continued to add to what has been a costly season for the U.S. SCS peril to date.

## Natural Catastrophes: In Brief

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### **Flooding (Canada)**

Amid ongoing significant flooding in Manitoba, additional communities in northern Alberta and the Northwest Territories have been affected by notable flooding in recent weeks - enhanced by spring snowmelt and ice breakup. In the Northwest Territories, evacuation orders were given for the K'at'l'odeeche First Nation and the Town of Hay River (~3,500 people) as inundation reached the downtown area. In Alberta, flooding in Chateh and John D'or Prairie prompted a local state of emergency declaration, which included evacuation orders for nearly 1,000 residents.

### **Flooding (India, Bangladesh)**

Intensive rainfall impacted north-eastern parts of India and eastern Bangladesh since May 12, triggering floods and landslides that resulted in casualties and notable material damage. Assam in north-eastern India was the worst hit with more than 660,000 people affected. Widespread damages in states and districts were reported, along with at least 16 fatalities, several injured people, and four missing persons. Thousands of houses were destroyed by flooding or landslides. Flooding caused additional agricultural damage on more than 1,700 ha (4,200 acres) of inundated farmland. The Kopili river in Kampur, Nagaon District, topped water level of 62 m (203 ft), breaking the previous water level record from July 2004. In eastern Bangladesh, a vast area was flooded, affecting thousands of people and claiming at least four lives. Damages to buildings and local infrastructure were incurred. Local agricultural department estimated crop damage on more than 500 ha (1,240 acres) at \$0.5 million.

### **Flooding (Vietnam, Thailand)**

The traditional dry season has ended for the northern ASEAN region. Heavy rain resulted in flooding and landslides in parts of Vietnam on May 9-13. Among the affected provinces were Cao Bang, Yen Bai, Lang Son, Quang Ninh, Ha Giang, Bac Kan, Dien Bien. According to data from national disaster management authorities, nine people were killed and no fewer than 100 homes were damaged or destroyed, with a majority located in Bac Kan and Lang Son. Additionally, about 5,700 ha (14,000 acres) of agricultural land was affected. Monsoonal rain bands additionally caused flooding in Thailand on May 14-18. No less than 460 houses across several provinces were inundated and at least one injury reported. Greater Bangkok received 10 hours of continuous downpour between May 17-18, paralysing road traffic in the metropolitan area.



## **Severe Convective Storms (Western, Central & Eastern Europe)**

In a strong westerly jet stream environment, an intense short-wave trough progressed towards Eastern Europe on May 12 and resulted in notable wind-related damage in Belarus, northern Ukraine and western Russia. In Bryansk and Kursk regions of Russia, more than 500 settlements were left without power. Additionally, an associated cold front, which stretched from Iberia to Eastern Europe and later became nearly stationary prompted further locally strong thunderstorms in Germany, Austria, Slovenia and Romania through May 13. Separately, locally strong thunderstorms, which developed on May 15-16 during the passage of a short-wave through and an associated frontal boundary of the low-pressure system Bora, caused minor damage in parts of Western Europe. Notably, large hail with maximum diameter of 4.5 cm (1.8 in) resulted in property damage in several villages of the Ille-et-Vilaine department in the Brittany region of France. Heavy rainfall additionally resulted in hundreds of interventions in the Haute-Savoie region of France and Nordrhein-Westfalen in Germany, particularly around Essen and Cologne. Thunderstorms further developed in the Alpine region, notably in Trentino-Alto Adige and Veneto regions of north-eastern Italy.

## **Flooding (Sri Lanka)**

Floods, landslides and strong winds resulted in damage in Rathnapura and Kalutara districts of Sri Lanka on May 13-16. In total, more than 2,000 families (or 8,300 people) were affected, according to the Disaster Management Centre. At least 230 homes and dozens of businesses were damaged and no fewer than 2 people were injured.

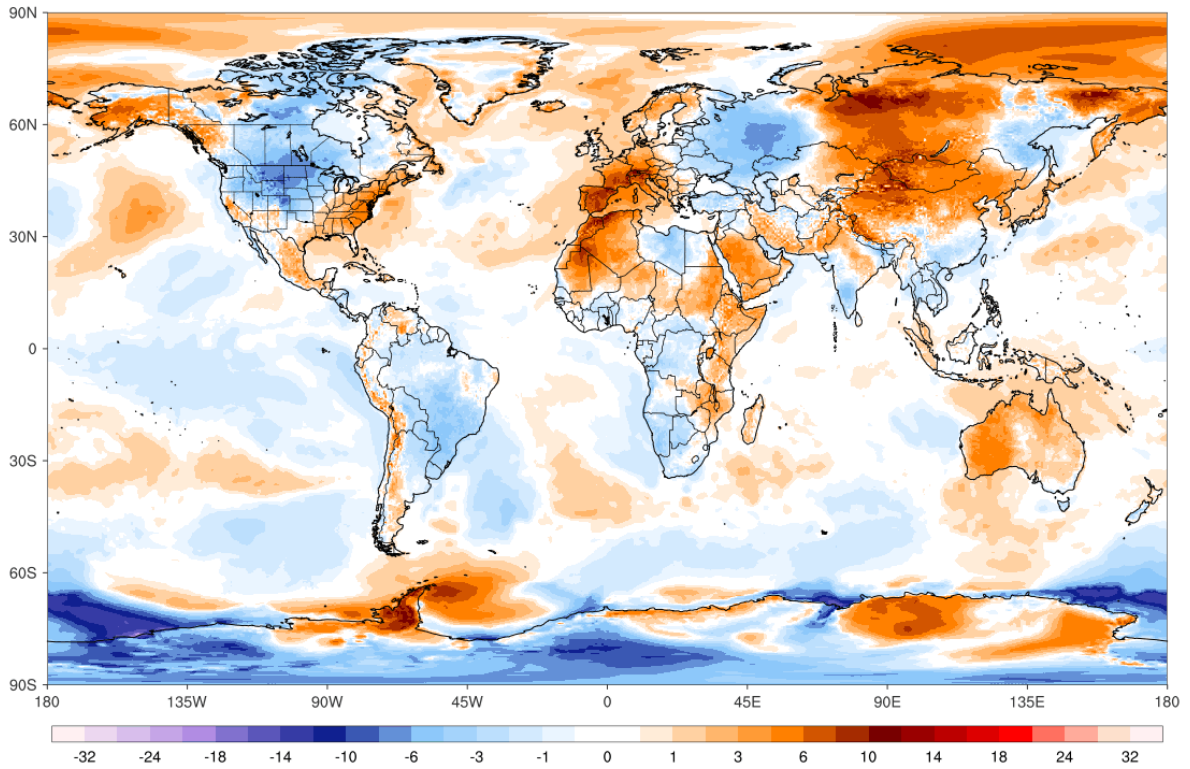
## **Subtropical Storm Yakecan (Uruguay, Brazil)**

An extratropical cyclone in the South Atlantic meandered off the coast of Brazil for several days between May 15-17 before obtaining subtropical characteristics and directly impacting Uruguay and southern Brazil by May 17, according to data from the Brazilian Navy Hydrographic Center. Subtropical Storm Yakecan generated rough seas, strong winds, and torrential rainfall which resulted in widespread damages. As of this writing, at least two fatalities were contributed to the storm. Maximum wind gusts reached 100 kph (62 mph) and resulted in torn off roofs, downed trees, and cut power lines. In southern Brazil, 220,000 people were left without electricity. In Uruguay, tens of thousands of customers lost electricity and notable impacts were reported along the coast – including in the Montevideo capital region.

## Global Temperature Anomaly Forecast

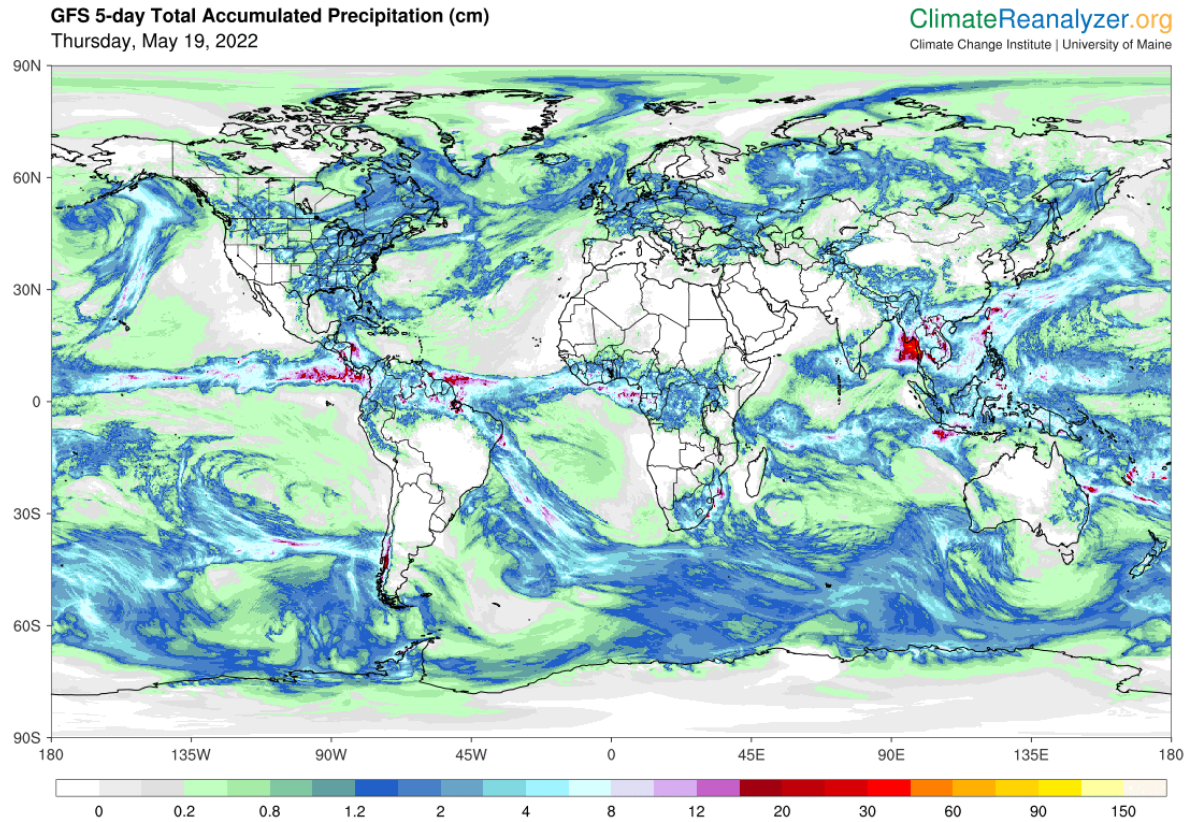
GFS/CFSR 5-day Avg 2m T Anomaly (°C) [1979-2000 base]  
Thursday, May 19, 2022

ClimateReanalyzer.org  
Climate Change Institute | University of Maine



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

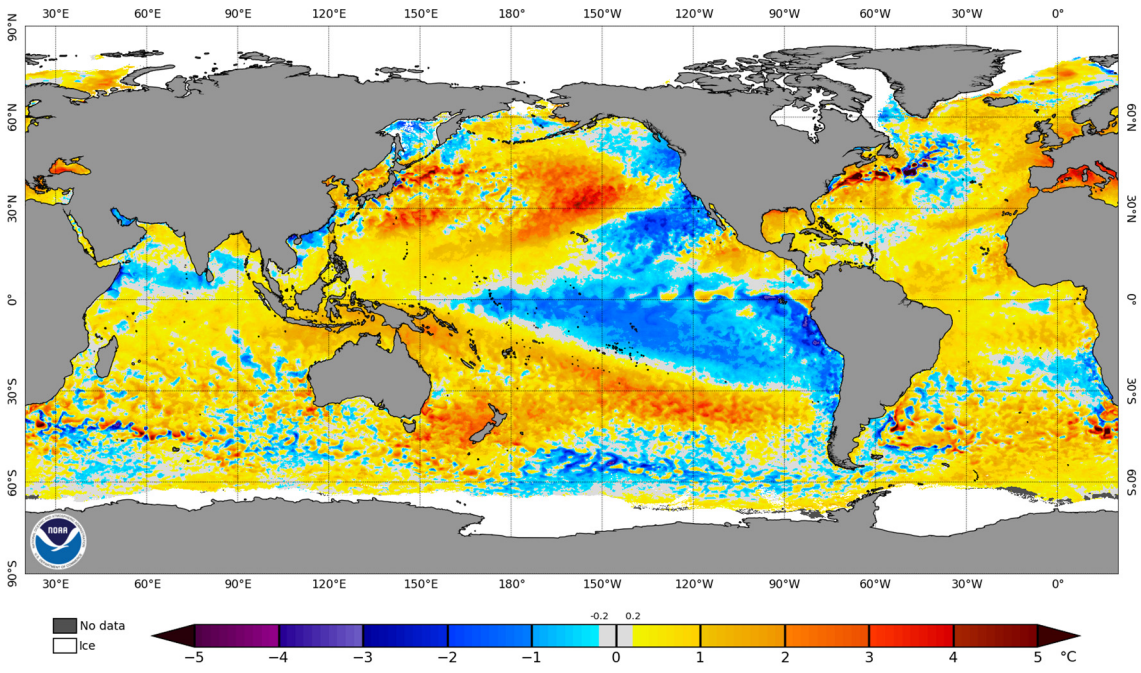
## Global Precipitation Anomaly Forecast



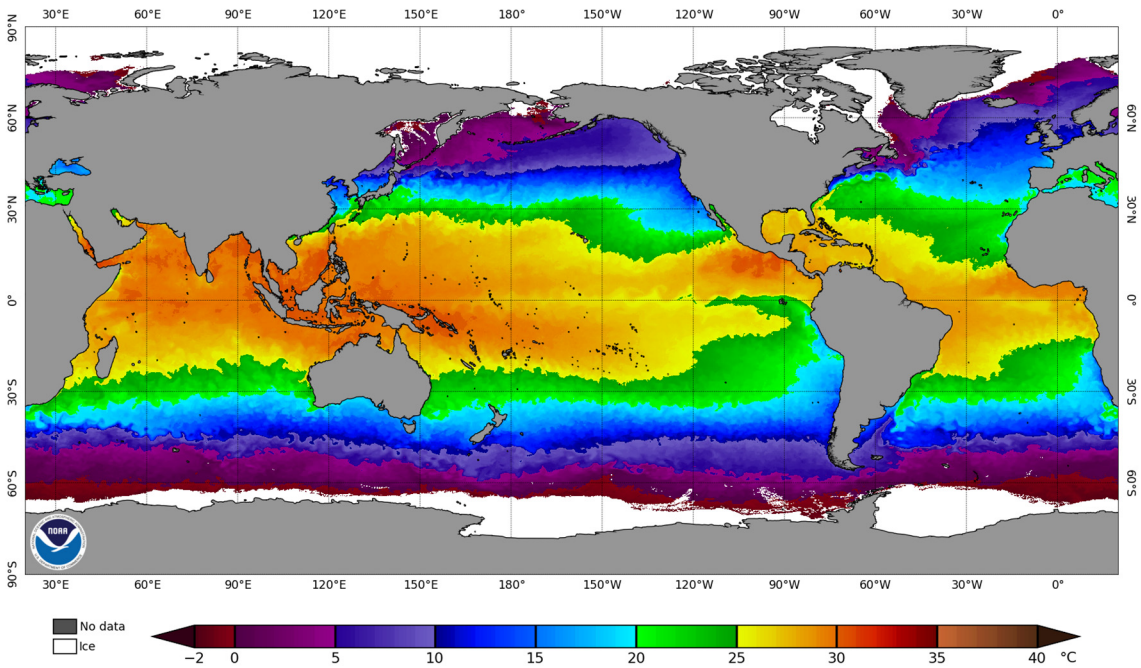
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

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

NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 17 May 2022



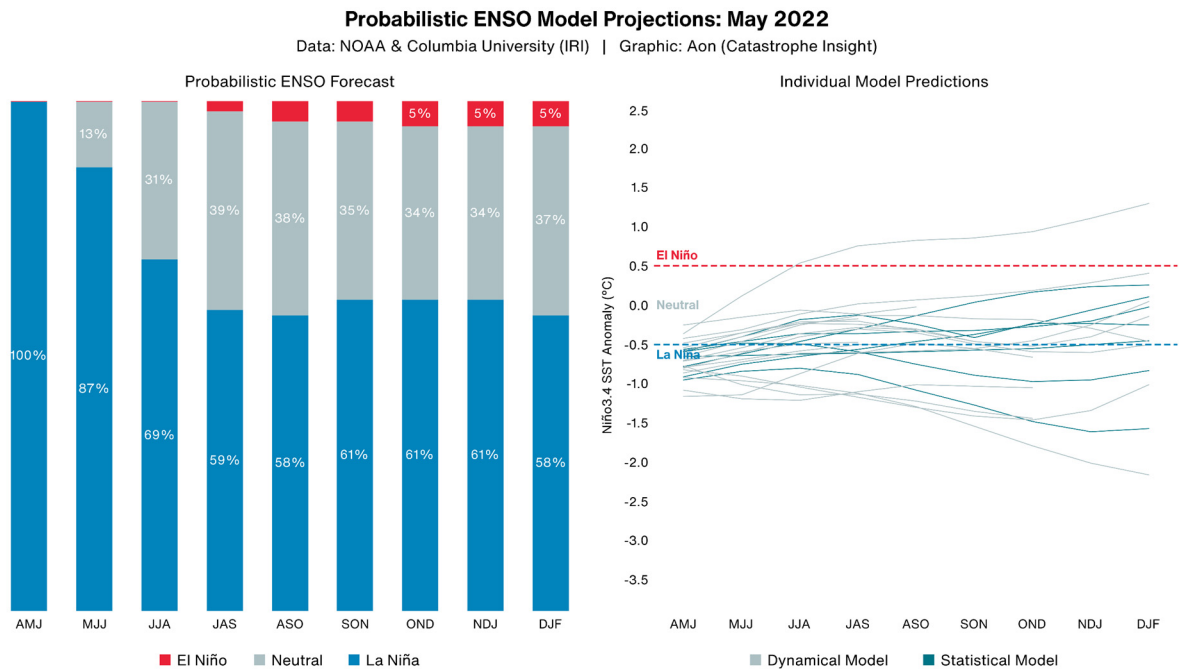
NOAA Coral Reef Watch Daily 5km Sea Surface Temperatures (v3.1) 17 May 2022



# El Niño-Southern Oscillation (ENSO)

## Overview

La Niña conditions are likely to continue for the next several months. NOAA cites a 58 percent chance of La Niña conditions persisting through most of the summer, and a 61 percent chance of continuing into the boreal (northern hemisphere) winter months.



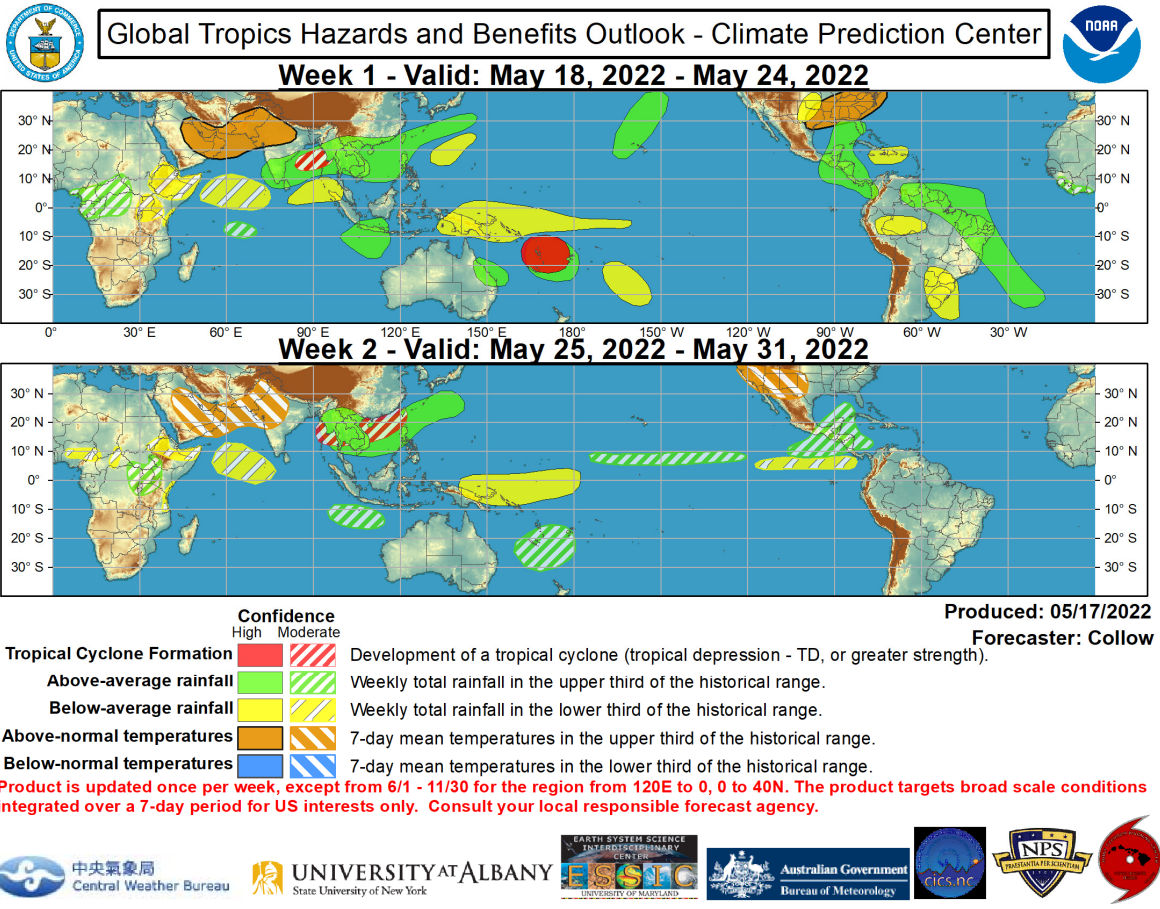
**El Niño:** Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.

**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.

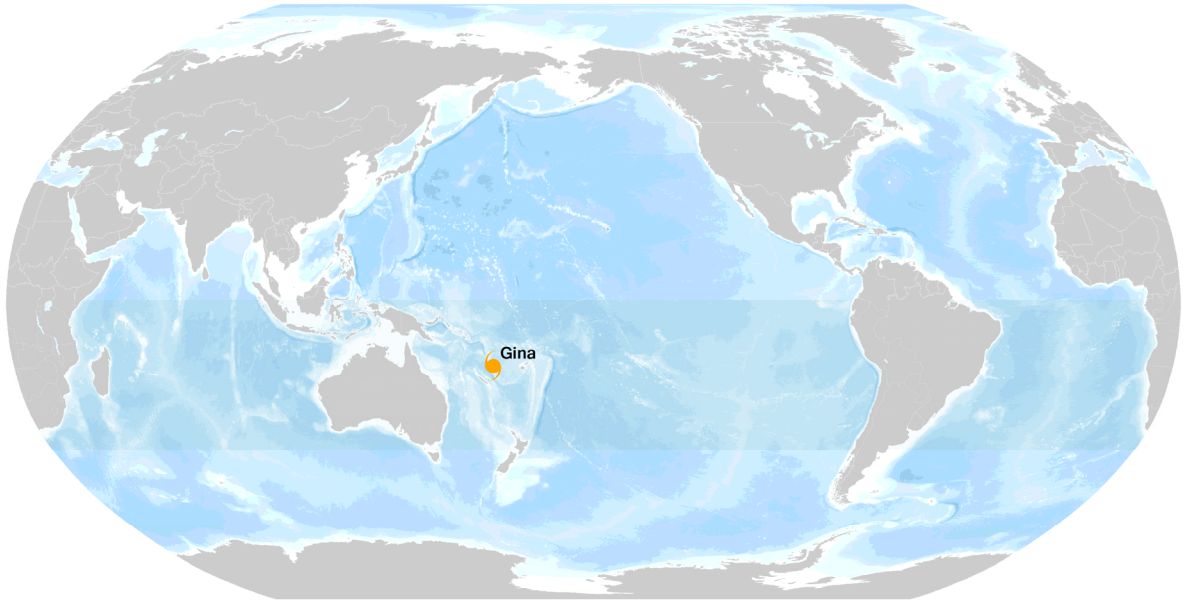
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

## 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

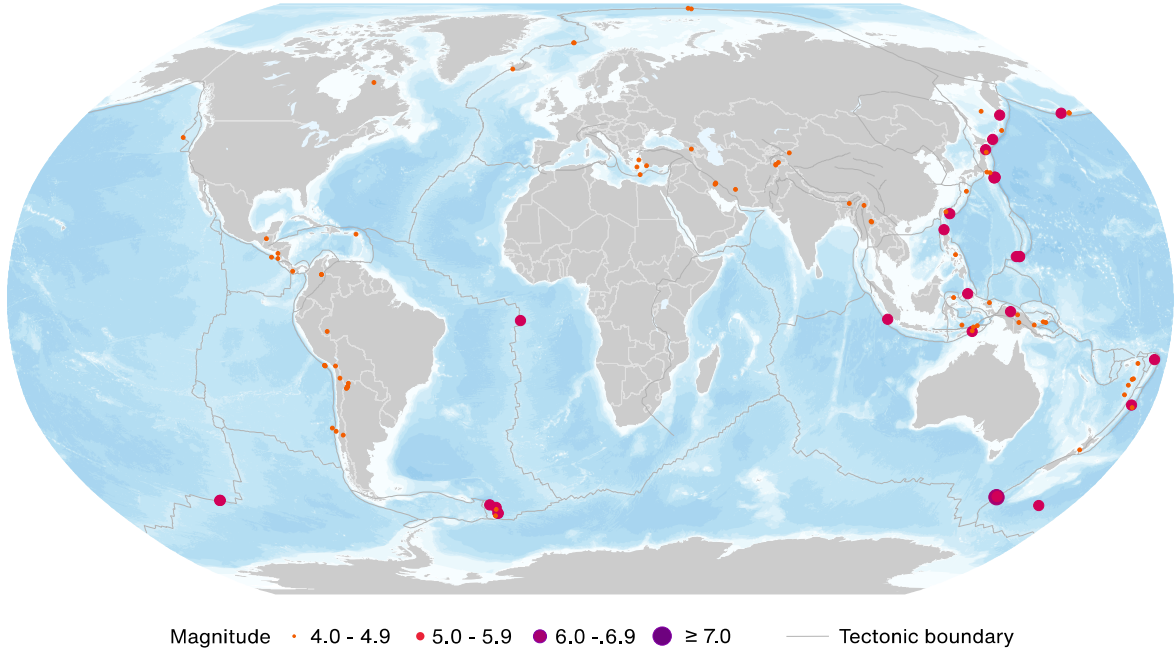
Storm Name	Location	Winds	Location from Nearest Land Area
CY Gina	17.3S, 168.8E	40 mph	45 mi (70 km) NE from Port-Vila, Vanuatu

\* 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 ( $\geq M4.0$ ): May 13 - 19

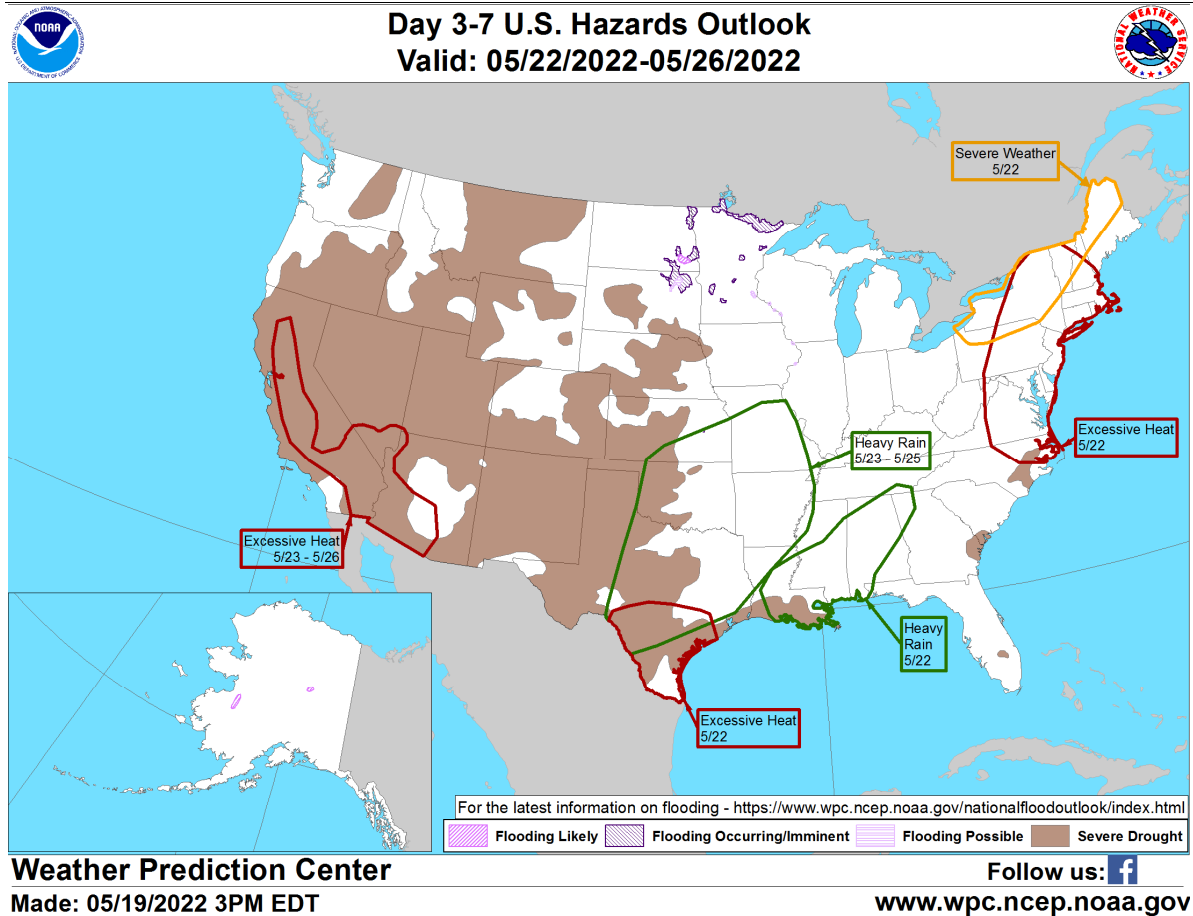


Date (UTC)	Location	Magnitude	Epicenter
5/19/2022	54.14S, 159.08E	6.9	Macquarie Island region

Source: United States Geological Survey



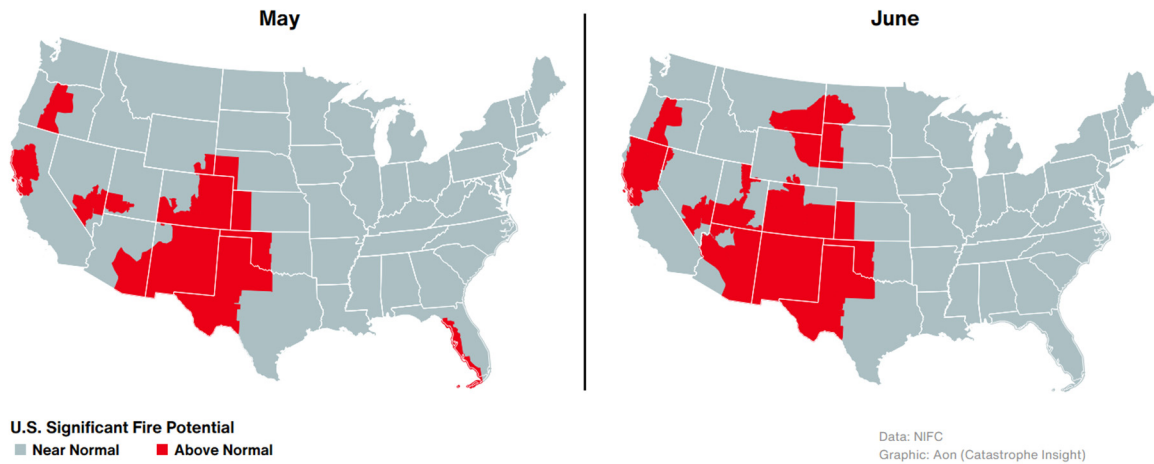
## U.S. Hazard Outlook



- Moisture pooling along a frontal boundary will result in heavy rainfall in the Lower Mississippi Valley and Southeast on May 22. A subsequent lingering boundary will bring further heavy rains to the Central and Southern Plains and Middle Mississippi Valley between May 23-25.
- A destabilizing atmosphere will create favorable conditions for severe weather across the Lower Great Lakes and New England on May 22. Excessive heat ahead of an approaching front is expected across much of the Mid-Atlantic and Northeast on the same day.
- Upper-level ridging will allow a prolonged period of excessive heat to build across the Southwest and California between May 23-26. Excessive heat is also expected in southern Texas on May 22.

Source: Weather Prediction Center (NOAA)

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



### Annual YTD Wildfire Comparison: May 19

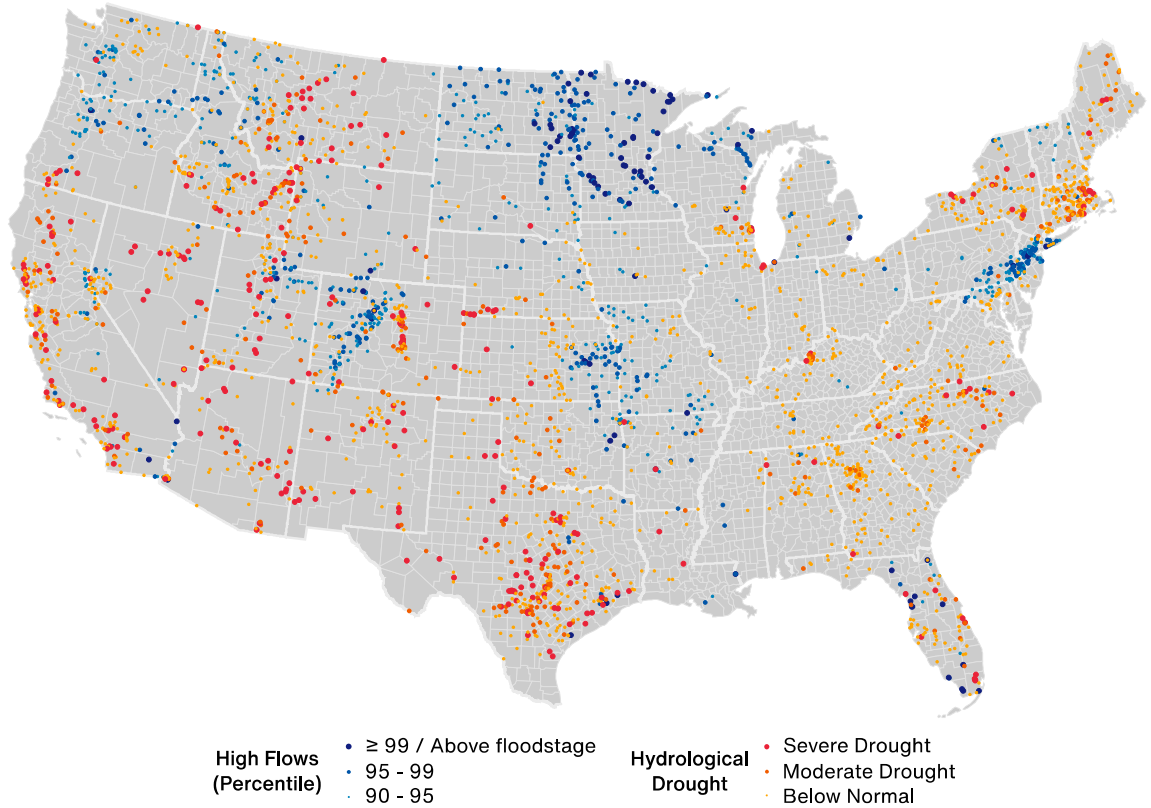
Year	Number of Fires	Acres Burned	Acres Burned Per Fire
2018	22,252	1,621,482	72.87
2019	12,761	231,691	18.16
2020	16,529	347,704	21.04
2021	22,189	575,199	25.92
2022	26,003	1,458,808	56.10
<b>10-Year Average (2012-2021)</b>	<b>19,323</b>	<b>795,324</b>	<b>41.16</b>

### Top 5 Most Acres Burned by State: May 19

State	Number of Fires	Acres Burned	Acres Burned Per Fire
Texas	4,357	469,889	107.85
New Mexico	256	389,181	1,520.24
Oklahoma	963	168,030	174.49
Nebraska	536	70,729	131.96
Kansas	51	58,438	1,145.84

Source: National Interagency Fire Center

## 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.

### Top 5 Rivers / Creeks: Highest Percentile for Water Height

Location	Current Stage (ft)	Percentile
Minnesota River at Mankato, Minnesota	17.70	99.15
Pembina River at Neche, North Dakota	15.12	99.13
Minnesota River at Montevideo, Minnesota	16.75	99.10
Mississippi River at St. Paul, Minnesota	13.09	99.08
Red River of the North at Fargo, North Dakota	23.97	99.04

Source: United States Geological Survey

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## Source Information

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### **United States: Severe Convective Storm**

U.S. National Weather Service

U.S. Storm Prediction Center

U.S. Weather Prediction Center

Death Toll Climbs After Derecho Across Midwest, Northern Plains, *The Weather Channel*

Violent storms blast Upper Midwest with hurricane-force winds, dust, *The Washington Post*

Hail downpours damage Cambridge, Maryland home, leaving holes in siding, *ABC 7 News*

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

Thousands Evacuate Floods in Alberta and Northwest Territories, *Floodlist*

Evacuation order issued for all of Hay River, N.W.T., *CBC*

5 Fatalities After Heavy Rain, Floods and Landslides in Assam and Meghalaya, *Floodlist*

Haute-Savoie: dozens of houses flooded after the violent storms of the night. *Franceinfo*

Severe storms with heavy rain in NRW: Man struck by lightning and critically injured. *RND*

Assam State Disaster Management Authority (ASDMA)

Sylhet city under water as flood situation worsens, *The Financial Express*

Vietnam Disaster Management Authority

Flooding in Bangkok after 10 hours of torrential rain, *Thaiger*

Disaster Management Centre, Sri Lanka

Cyclone Yakecan batters Uruguay and Brazil, *BBC News*

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