

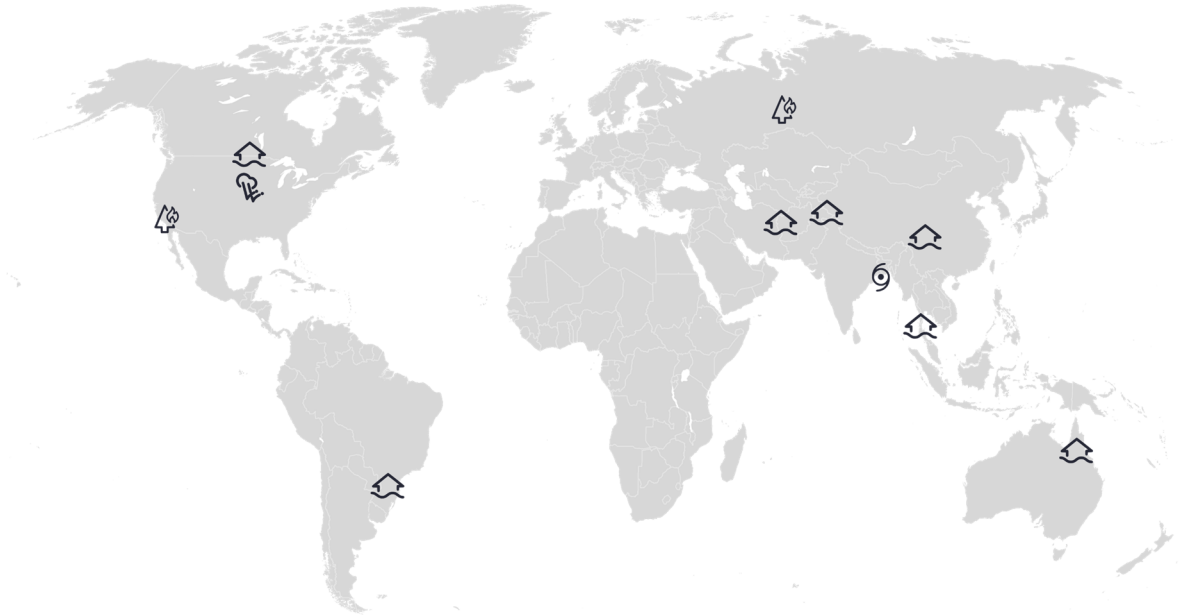
AON

Weekly Cat Report

May 13, 2022



Executive Summary



Event	Affected Region(s)	Fatalities	Economic Loss (\$)	Page
Severe Convective Storm	United States	2+	100s of Millions	3
Flooding	Brazil	3+	Unknown	7
Flooding	Afghanistan	29+	Negligible	7
Flooding	Pakistan	0	Unknown	7
Flooding	Thailand	1+	Negligible	7
Tropical Cyclone Asani	India, Bangladesh	1+	Millions	8
Flooding	China	0	10s of millions	8
Flooding	United States & Canada	0	Millions	8
Flooding	Australia	1+	Millions	8
Wildfire	Russia	16	Unknown	9
Wildfire	United States	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>

United States: Severe Convective Storm

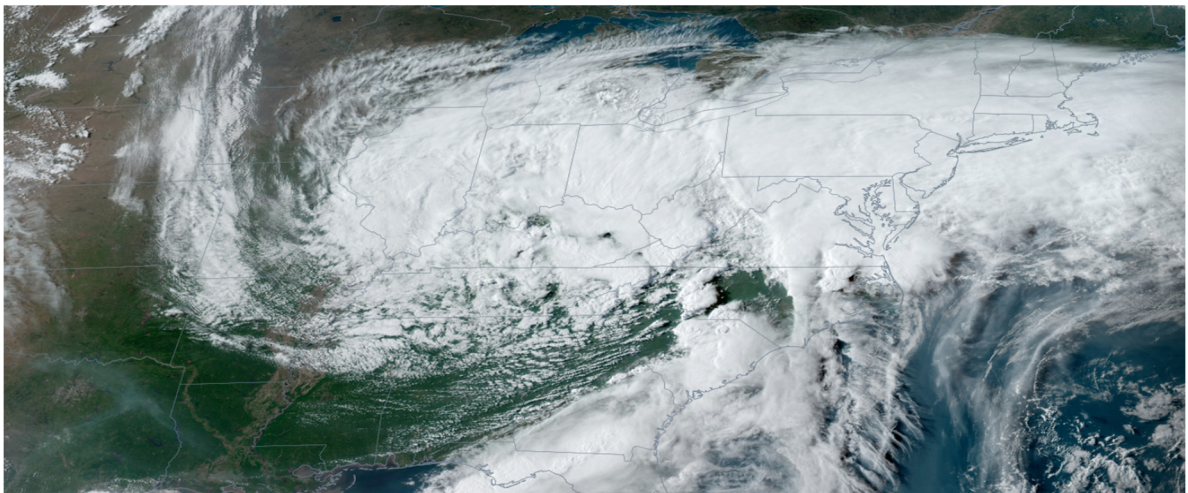
Overview

After generating widespread impacts across the Plains on May 4-5, a slow-moving upper-level low resulted in torrential rainfall and severe convective storms (SCS) in the Southeast, Appalachians, and Mid-Atlantic between May 6-7 before lingering offshore from the Carolinas. Hazards included hundreds of reports of severe straight-line winds, isolated tornadoes, and large hail. Furthermore, notable flash-flooding occurred in West Virginia. Subsequently, a succession of disturbances continued an active SCS pattern across the Plains and Upper Midwest through May 12 – localities in Minnesota were particularly affected by the storms. Total economic and insured losses were expected to each reach into the hundreds of millions (USD).

Meteorological Recap

May 5-7

After producing widespread flash-flooding and severe weather across the Southern Plains and Lower Mississippi Valley on May 4-5, a vertically stacked low pressure system continued to meander across the Plains and toward the Eastern Seaboard on May 6. This resulted in a period of unsettled weather and thunderstorm activity in the Southeast, Appalachians, and Mid-Atlantic as the low and associated frontal system tracked across the region between May 6-7.



Sprawling storm system across the eastern United States on May 6

Source: NOAA/RAMMB

A large **Enhanced Risk** (level 3 out of 5) for severe convective storms (SCS) was delineated by the Storm Prediction Center (SPC) on May 6 from coastal Virginia southward into the Florida Panhandle and encompassed at least 24 million people. Throughout the day, thunderstorms were focused along and ahead of an eastward moving cold front, while additional storms evolved in North Carolina and Virginia as a warm front lifted through the region. Severe weather was aided by favourable upper-level jet stream support and heightened low-level wind shear (change in wind speed and/or direction with height).

By the afternoon, clusters and bowing storm segments resulted in instances of damaging straight-line winds, large hail, and tornadoes. The severe threat continued into the overnight as storms progressed toward the coast. A supercell in north-central North Carolina prompted a **Particularly Dangerous Situation** (PDS) tornado warning in Rockingham County (north of Greensboro) as a confirmed tornado was spotted near Wentworth.

Concurrently, abundant low-level moisture combined with repeating thunderstorm and heavy convective rainfall produced areas of **flash-flooding** – particularly across the central Appalachians. Rainfall rates which exceeded 1.0 in (25 mm) per hour generated notable flash flooding in parts of Kentucky, West Virginia, and Virginia.

As the low pressure lingered offshore of the Carolinas in subsequent days, significant coastal hazards were observed. These included high seas, flooding, and beach erosion – impacts were most notable along North Carolina’s Outer Banks.

May 9-11

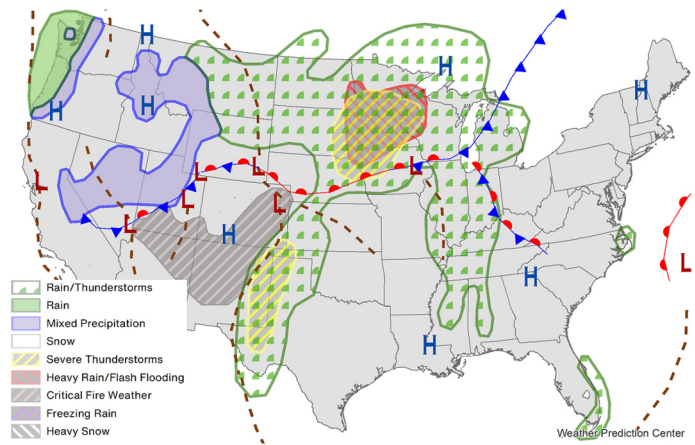
Embedded shortwave disturbances pivoting around broader troughing in the Western United States resulted in multiple days of enhanced SCS activity across the Plains and Upper Midwest through May 12.

On May 9, episodes of SCS and locally heavy rains impacted the Upper Midwest and Great Lakes where an **Enhanced Risk** (level 3 out of 5) for severe weather was delineated. Early day elevated convection, associated with a potent low-level jet, was most pronounced across southern Minnesota and northwest Wisconsin. The predominant hazard was very large hail reaching and topping 2.0 in (5.1 cm). An increasingly unstable atmosphere evolved into the afternoon as low-level moisture streamed northward ahead of an approaching front..

On May 10, non-tornadic wind gusts reaching and exceeding 80 mph (128 kph) were associated with northward propagating thunderstorm clusters and an organizing **quasi-linear convective system** (QLCS) in the Texas Panhandle.

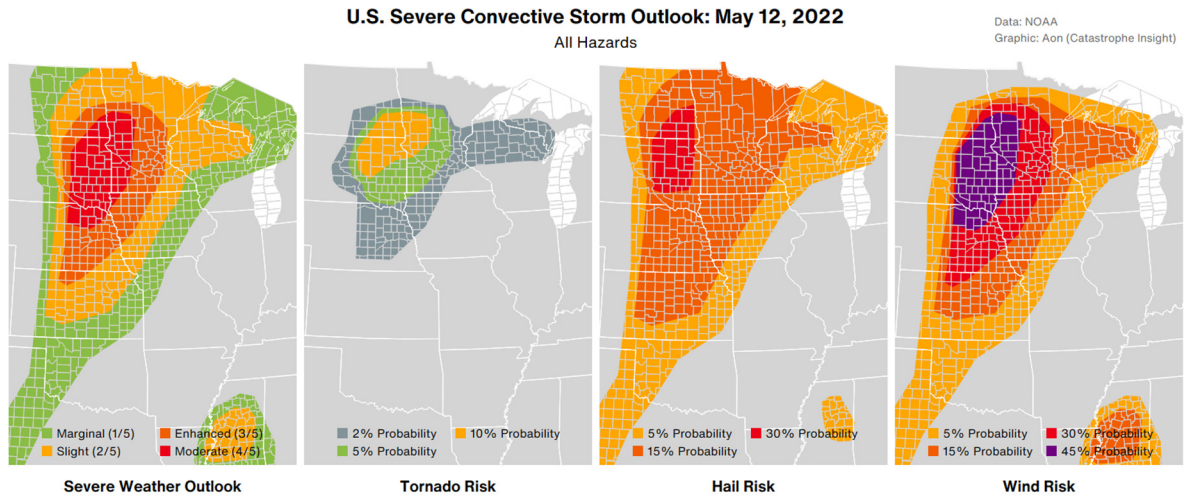
By May 11, severe storms were ignited in northern Iowa and Minnesota in the vicinity of a northward lifting warm frontal boundary and embedded mesoscale convective vortex (MCV), which propagated northeastward through the region. The SPC issued an **Enhanced Risk** (level 3 out of 5) for severe weather anchored across central and southern Minnesota. A bowing **mesoscale convective system** (MCS) brought high winds, large hail, and reported tornadoes to southern and central Minnesota in the evening – including the Minneapolis St. Paul metro region.

A considerable contrast between cooler temperatures in the West and summer-like warmth in the Plains aided in the rapid formation of a low-pressure system which swept through the northern Plains beginning May 12 and was accompanied by heavy rain, severe thunderstorms, and strong winds. A **Moderate Risk** (level 4 out of 5) for severe weather was forecast across parts of the Upper Midwest and



U.S Surface Analysis on May 11
Data: Weather Prediction Center

Plains associated with the well-defined frontal system. By the afternoon hours, a robust line of thunderstorms, which developed in south central Nebraska, generated damaging wind gusts which reached 80 mph (128 kph) while tracking to the northeast. The threat for additional SCS remained ongoing as of this writing.



Event Details

May 5-7

In **Texas**, at least three tornadoes were surveyed in Rusk and Panola Counties on May 5. The strongest, an EF2, obtained a maximum width exceeding 0.5 mi (0.8 km) with wind speeds reaching 115 mph (185 kph). Overall, thousands of trees were snapped or uprooted, and multiple structures were damaged.

In **North Carolina**, an EF1 tornado in Rockingham County resulted in impacts to trees, homes, and agricultural operations near the Town of Wentworth on May 6. Impacts to several homes and fallen trees were among the surveyed damages. In Orange County, an EF1 tornado toppled a brick wall at a manufacturing facility near Mebane, where at least 30 people resided. Fortunately, no injuries were reported. Roofs and walls of structures and homes were subsequently damaged, primarily by fallen trees.



Damage near Wentworth, NC

Source: NWS-DAT

In **West Virginia**, a State of Emergency was declared in Cabell, Putnam, and Roane Counties by May 7 following torrential rainfall and flash-flooding. Notable impacts were incurred in the City of Huntington, where evacuations, impassable roadways, and widespread damages to property were reported - including multiple flooded basements. The mayor declared a local State of Emergency to further assist those affected by the floods. At least one death was confirmed.

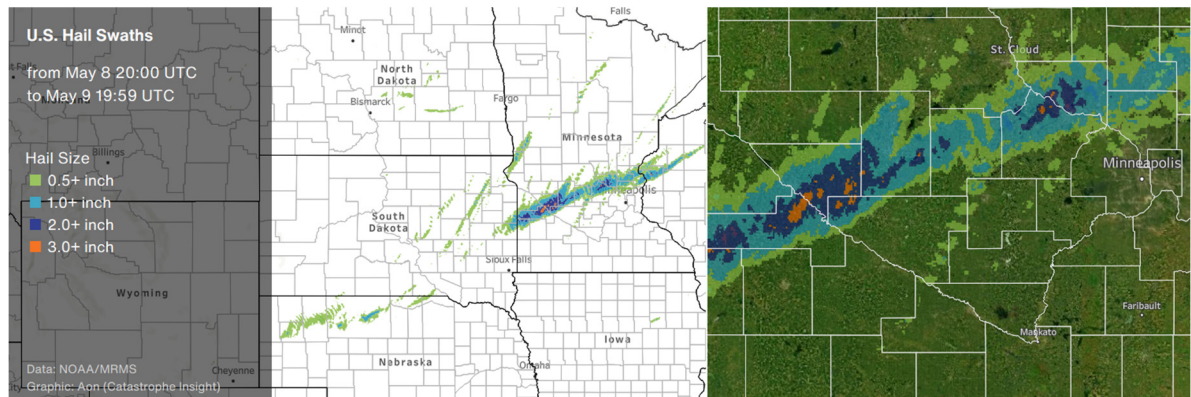
No fewer than 100,000 customers across Tennessee, North and South Carolina, and Georgia lost electricity on May 6. Hailstones reaching and exceeding 2.0 in (5.1 cm) were reported in Cumberland County in **Tennessee**, Richmond County in **Georgia**, and Rockingham, Cleveland, and Caswell Counties

in **North Carolina**. Straight-line winds, which topped 60 to 70 mph (96 to 112 kph), downed trees and utility lines and generated property damages regionwide. In **Florida**, a gust of 90 mph (144 kph) was measured in Taylor County. No fewer than 227 reports of severe winds were received on May 6 alone.

As the low lingered offshore in subsequent days, impacts due to unrelenting northerly winds and high surf were incurred in coastal **North Carolina**, particularly in the Outer Banks. By May 11, portions of Highway 12 were temporarily shuttered, and several beachfront homes collapsed into the ocean.

May 9-11

On May 9, early day thunderstorms resulted in large hail in **Minnesota** and **Wisconsin**. In Minnesota, hailstones in Kandiyohi County reached baseball size, 2.75 in (7.0 cm), while reports of golf ball size and larger hail spanned a swath across a southern corridor of the state. Extensive hail damages were noted in Lac Qui Parle, Chippewa, and Kandiyohi Counties. These included dented siding, roofs and facades, in addition to impacts to vehicles and vegetation. Severe non-tornadic winds led to tree and structural damages. A gust of 76 mph (122 kph) was measured in Olmsted County.



In **Texas**, a non-tornadic wind gust of 87 mph (140 kph) was reported in Lamb County on May 10 near Amherst, while an 86 mph (138 kph) gust was measured in Castro County on the same day.

On May 11, no fewer than 75,000 customers in **Minnesota** lost electricity in the wake of severe storms. Damaging straight lines across central and southern parts of the state toppled trees, downed power lines, and impacted multiple properties. Widespread impacts were incurred in the Minneapolis metro region, including inundated roadways and flooded vehicles. Hail reaching or exceeding 2.0 in (5.1 cm) were reported in Goodhue, Kandiyohi, Scott, and Wabasha Counties. A wind gust of 79 mph (127 kph) was measured in Rice County, near Morristown. At least one fatality was reported.

As of this writing, widespread severe weather remained ongoing in parts of the Upper Midwest. If necessary, updates will be provided in future Weekly Cat Reports.

Financial Loss

Total combined economic and insured losses from the latest stretch of severe convective storms between May 5-11 were each individually expected to reach into the hundreds of millions (USD). This will add to what has already been an active start of the year for the peril as peak severe weather season continues through June. Nationwide, SCS insured losses during the first four months of 2022 alone topped \$6 billion.

Natural Catastrophes: In Brief

Flooding (Brazil)

An episode of extreme rainfall resulted in significant flooding and landslides across southern Brazil during the first week of May. The State of Santa Catarina was most impacted with several locations measuring rainfall totals topping 300 mm (11.8 in) in the 72-hour period ending May 5. The São Martinho region reported 375 mm (14.8 in) during this time. As of this writing, at least three fatalities were confirmed, while nearly 44,000 people were impacted and at least 7,618 displaced from their homes. A State of Emergency was declared in no less than 11 cities, and thousands of residents lacked access to electricity and clean water.

Flooding (Afghanistan)

Flash floods ravaged twelve provinces of northern Afghanistan and killed at least 29 people between May 2-7. The rain was particularly heavy in Badghis, Faryab, and Baghlan, affecting more than 3,400 people. According to Afghanistan's National Disaster Management Authority (ANDMA), an additional 40 people were injured, 1,200 ha (3,000 acres) of crops were damaged, and at least 2,500 houses were inundated. Landslides blocked roads in Bamyán, Jawzjan and Badakhshan provinces. Neighbouring Pakistan rendered relief assistance on May 7. Most of the residential houses in the countryside area were mud houses and economic losses were expected to be non-significant.

Flooding (Pakistan)

A premature glacial meltdown under the prevailing heatwave conditions in northern areas of Pakistan caused a dam in the Hunza district to fail on May 7, triggering a Glacial Lake Outburst Flood (GLOF). The Shisper Glacial Lake had grown by at least 40 percent over the past 20 days. Massive flooding disconnected Gilgit and Hunza, with the Hassanabad bridge on the Karakoram Highway being swept away. Thousands of passengers were stranded between central and upper Hunza. Two hydro power plants and scores of houses were damaged. Families near the riverbed were evacuated to safety centres while authorities continued with damage assessments in the valley area.

Flooding (Thailand)

A brewing circulation over the Andaman Sea that intensified into tropical cyclone Asani caused widespread flooding in southern Thailand and fluvial flash flooding in north-western Thailand. Chiang Mai reported flash floods on May 7, with roads drenched and four villages inundated. In southern Thailand, three provinces- Chumphon, Surat Thani, Nakhon Si Thammarat, were severely hit as floods washed off bridges, over roads, and inundated 350 homes. One fatality occurred. The rain belt continued to move south and submerged large swaths of farmland and three villages in Songkhla by May 9. Economic losses were anticipated to be negligible.

Tropical Cyclone Asani (India, Bangladesh)

An active phase of the intraseasonal Madden-Julien Oscillation (MJO) and convectively coupled equatorial-Rossby (ER) waves between May 4-8 seeded twin cyclones- Asani and Karim, in the Indian Ocean. Tropical cyclone Asani lashed heavy rain on Kolkata and Bangladesh on May 9, with knee-deep waters in the hub area. Flights in and out of Andhra Pradesh were cancelled on May 10. Six boats in Aryapalli capsized, but fortunately with no casualties. Hovering around the Bay of Bengal, Asani weakened as it tracked northward along Visakhapatnam coasts by May 11 and brought respite to eastern India from the ongoing heatwave. Bengaluru recorded its coldest May in 22 years. One man died from the effects of strong winds. Economic losses were expected to be in the millions (USD).

Flooding (China)

Large parts of southern China saw seasonal floods between May 9-13. At least 5,700 people in Sichuan were pre-emptively evacuated. Rainfall was particularly heavy in Leshan city where 186 mm (7.3 in) fell in less than 24 hours. Torrential rain also caused riverine flooding in Xiangxi and Hengshan, Hunan, with landslides destroying dozens of houses and cropland submerged. A section of the highway towards Zhangjiajie collapsed. In Chongqing, at least 3,300 people across 38 towns were affected. Vegetable fields in Bishan and Tongliang districts were inundated. Transport along the Li River in Guangxi were suspended. Weather conditions deteriorated on May 11 with rainfall topping 326 mm (12.8 in) in Zhuhai, forcing authorities to suspend schools and sections of the Shenzhen Railway. A hail episode also affected Gansu on May 11, damaging large areas of cornfields. The combined economic toll was expected to be significant.

Update: Flooding (United States & Canada)

Bouts of heavy rainfall and strong winds prolonged significant riverine and overland flooding across southern Manitoba in Canada and the Upper Midwest in the United States – predominantly in the Red River Valley. The Manitoba Hydrologic Forecast Centre issued an Overland Flood Watch for all central and southern parts of the province on May 9. As of this writing, at least 26 communities declared a local State of Emergency. Hundreds of people were evacuated, roadways were inundated, and the town of Morris was isolated by floodwaters. In the United States, water levels along at least nine gages reached the most severe, major flood stage, by May 10. Notable urban flooding was incurred in populated regions of North Dakota, near and in Fargo, on May 9. Water levels were anticipated to remain high in the coming days. Total economic losses were expected to reach well into the millions (USD).

Flooding (Australia)

Extensive rain placed more than two-thirds of Queensland under flood watches between May 10-12. May is historically the onset of the dry season, but several places in Queensland such as Conclurry, Hughenden, Charters Towers and Hamilton Island had rainfall records broken. Parts of Townsville received more than 100 mm (3.9 in) of rain in an hour, causing the Haughton River to reach major flood level. The heaviest rainfall was further north over Mourilyan with 244 mm (9.6 in) on May 11. No fewer than 300 roads in northern Queensland were cut off. One fatality and one injury were reported near Mackay. Beaches in the Sunshine and Gold Coasts were closed, and ferry services in Brisbane were suspended. At least 1,500 residents in Brisbane were affected by power cuts. This came a week after the Insurance Council of Australia (ICA) revealed that the February / March 2022 floods in Eastern Australia were the country's costliest on record for the local insurance industry.

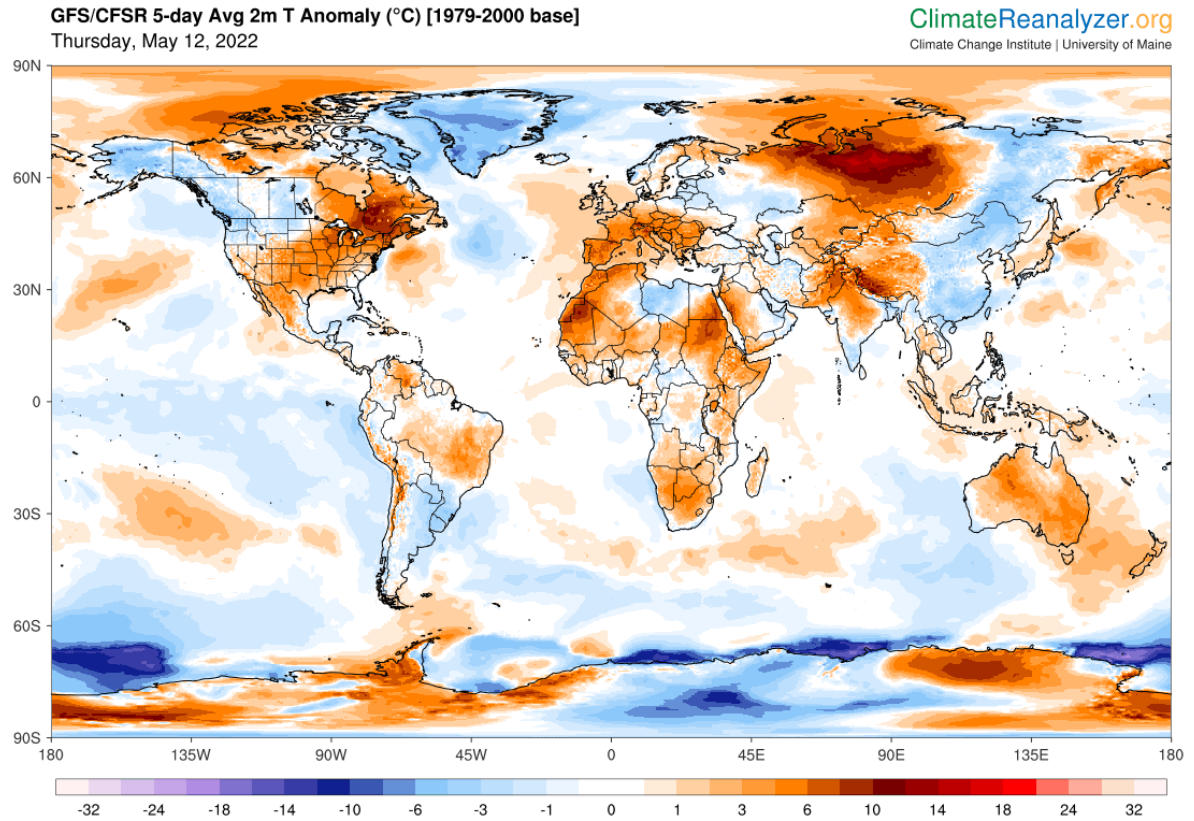
Wildfire (Russia)

Significant wildfires ignited across multiple federal subjects of Russia in May, claiming the lives of at least 16 people. According to disaster management authorities, nearly 1,300 buildings were destroyed in the fires so far, including at least 730 residential structures. The worst situation ensued in Kurgan, Krasnoyarsk, Kemerovo, Irkutsk, Omsk, and Novosibirsk regions. Eight people were killed in the Krasnoyarsk Territory alone. Dozens of people were injured.

Wildfire (United States)

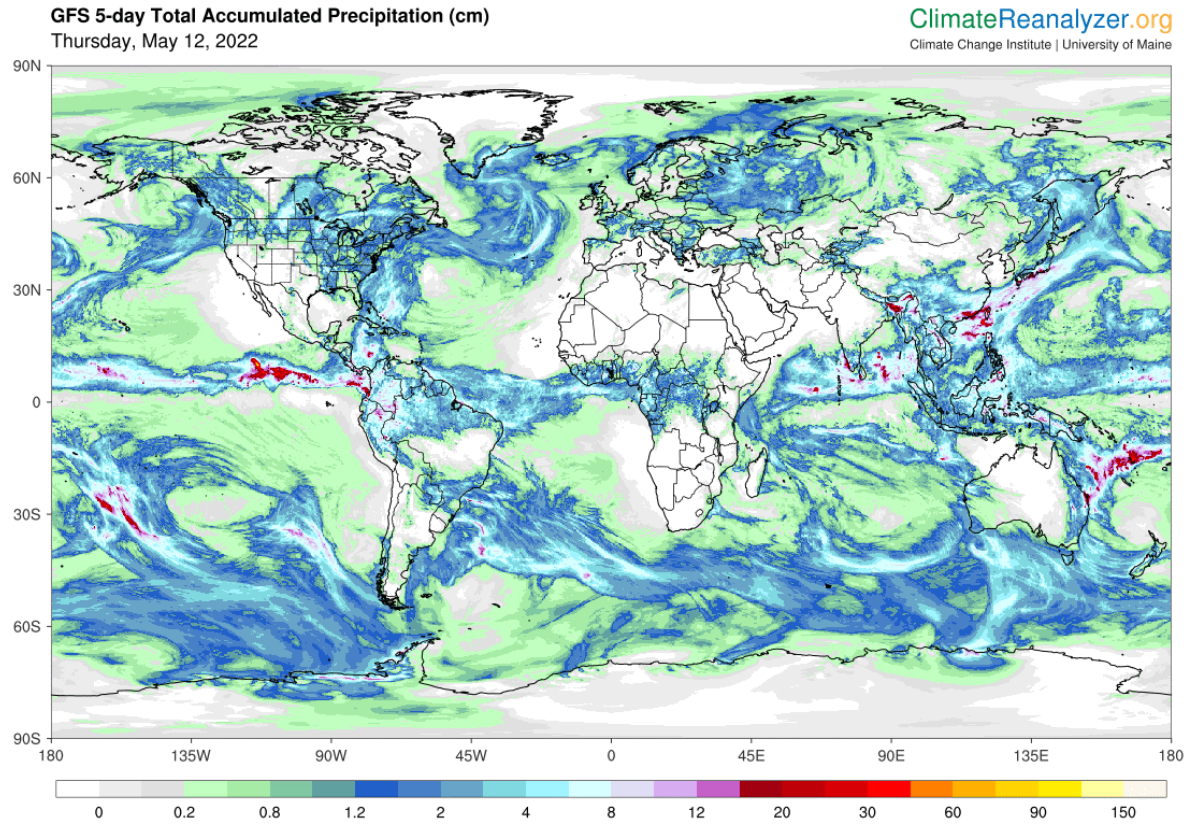
A quickly spreading wildfire in southern California was ignited in Orange County on May 11 near the Laguna Niguel neighbourhood. The aptly named Coastal Fire affected 199 acres (80 ha) by the afternoon of May 12 and was aided by westerly winds and abundant dry fuels. Hundreds of residents were evacuated while a minimum of 20 homes in an upscale neighborhood were burned. Economic and insured losses were minimally expected to reach well into the millions (USD). Elsewhere, two injuries and further evacuations were ordered due to a wildfire in Fresno County. In New Mexico, the Calf Canyon and Hermit Peak Fire Complex affected 259,810 acres (105,141 ha) since April 6 and is currently the largest active fire in the country. The fire complex burned at least 172 homes along with additional structures since it was first discovered. That fire was also anticipated to result in tens of millions of dollars (USD) in insured losses.

Global Temperature Anomaly Forecast



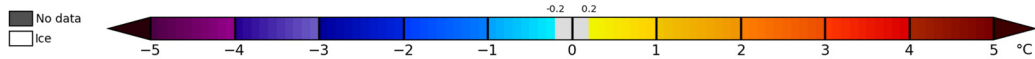
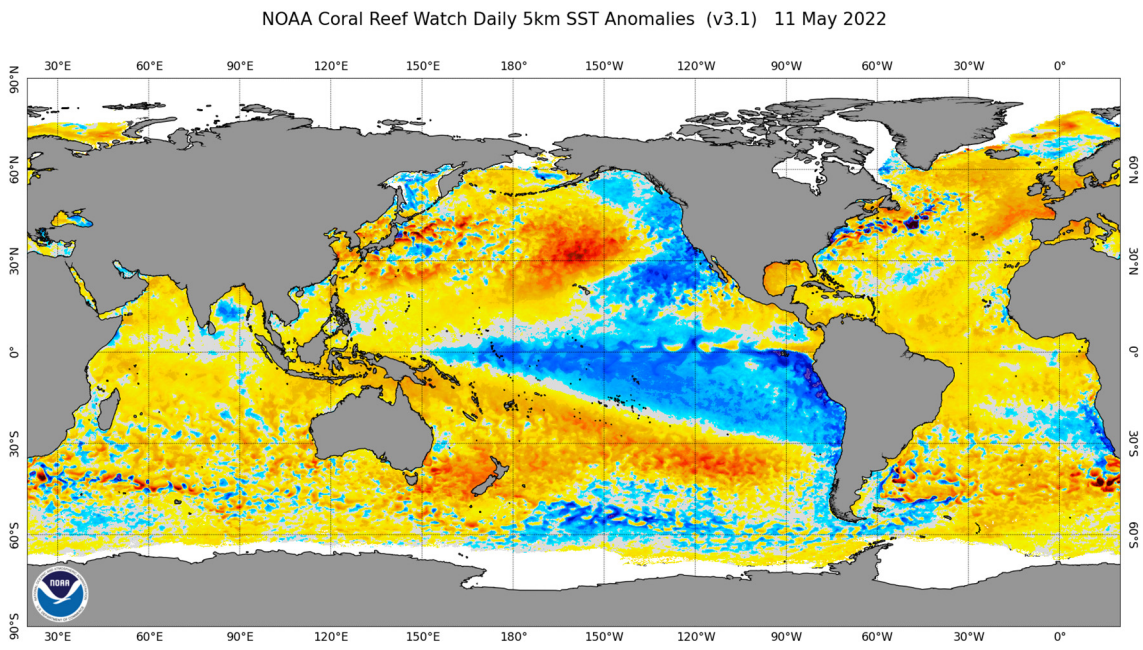
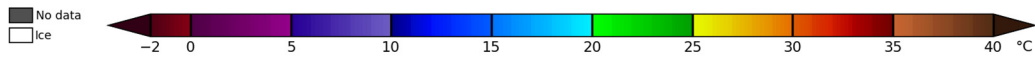
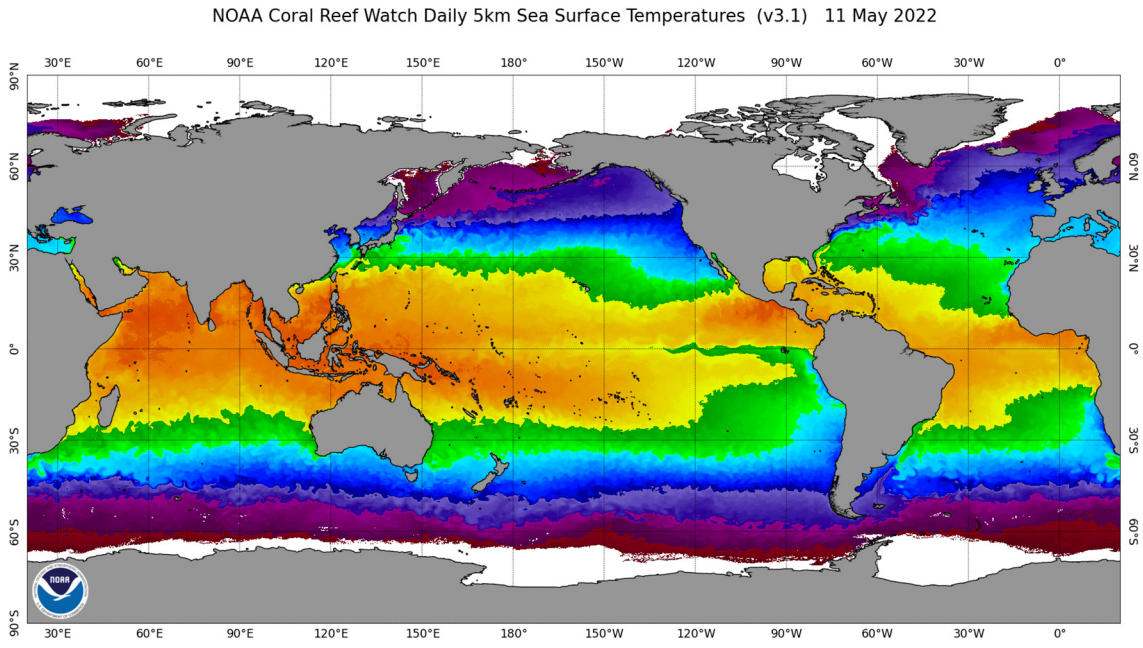
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Anomaly Forecast



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

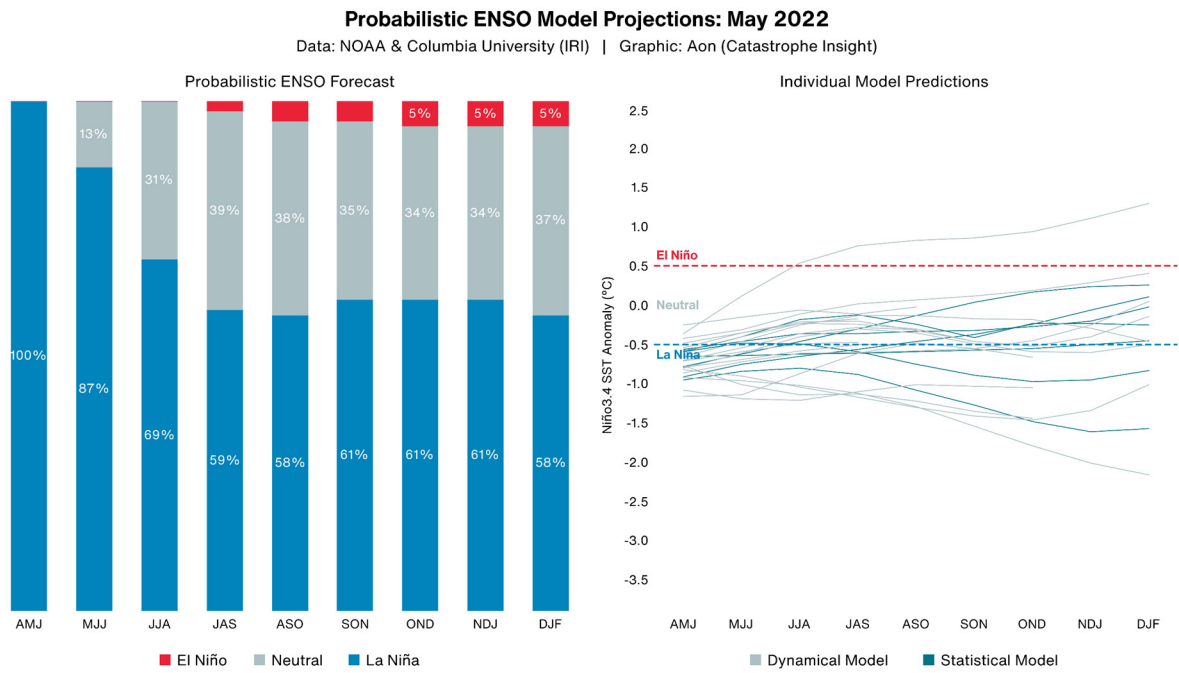
Weekly Sea Surface Temperature (SST) Maps (°C)



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.



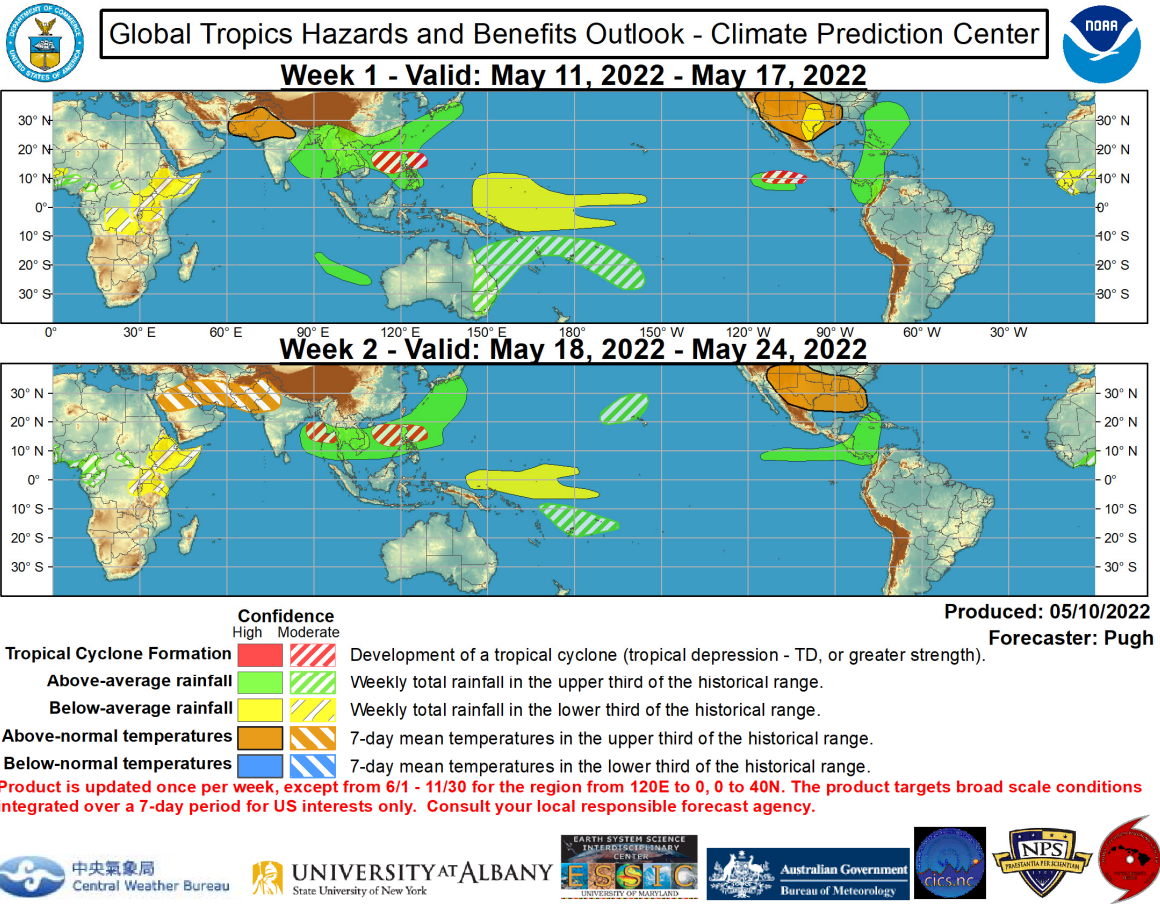
El Niño: Warm phase of an ENSO cycle. Sea surface temperatures of +0.5°C occur across the east-central equatorial Pacific.

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.

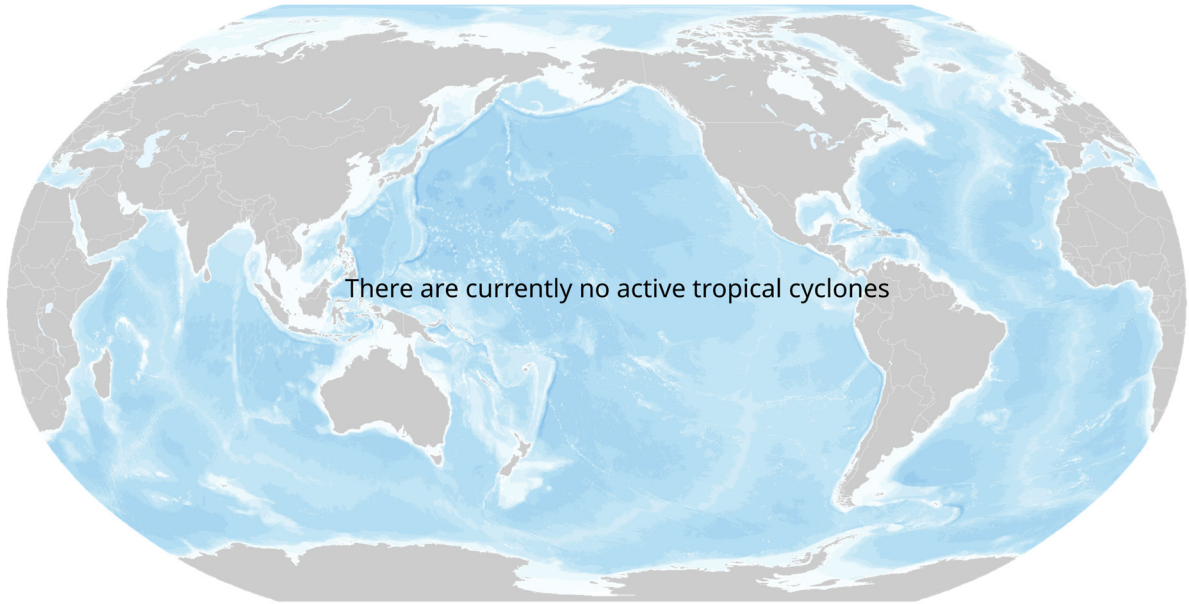
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

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

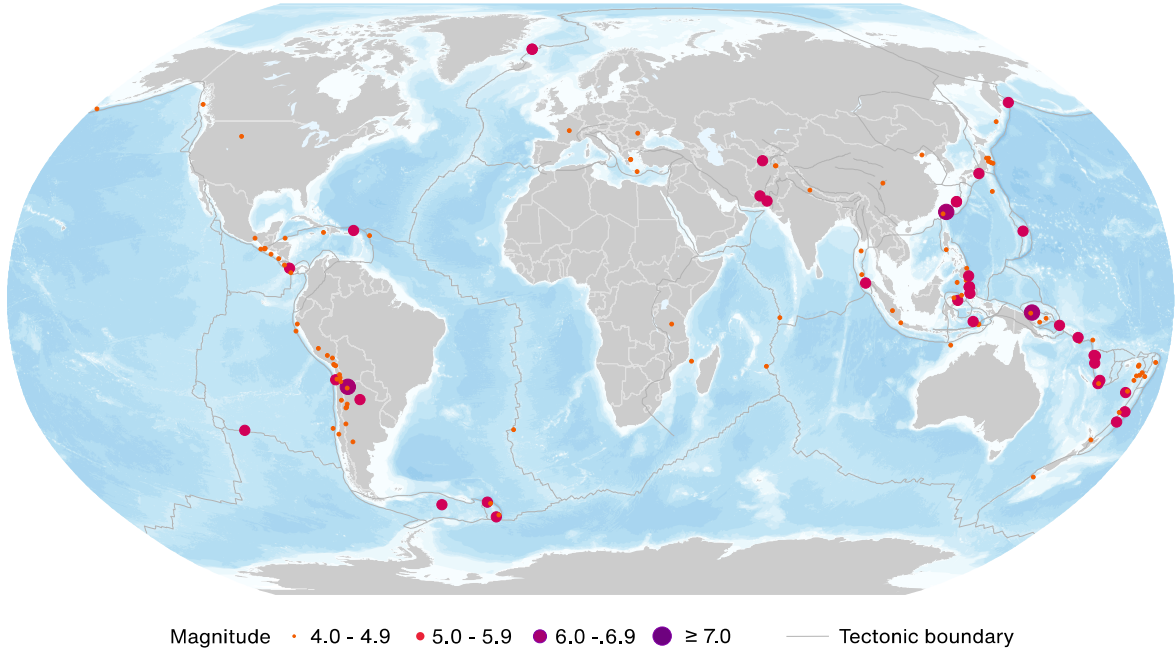
Storm Name	Location	Winds	Location from Nearest Land Area

* 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)

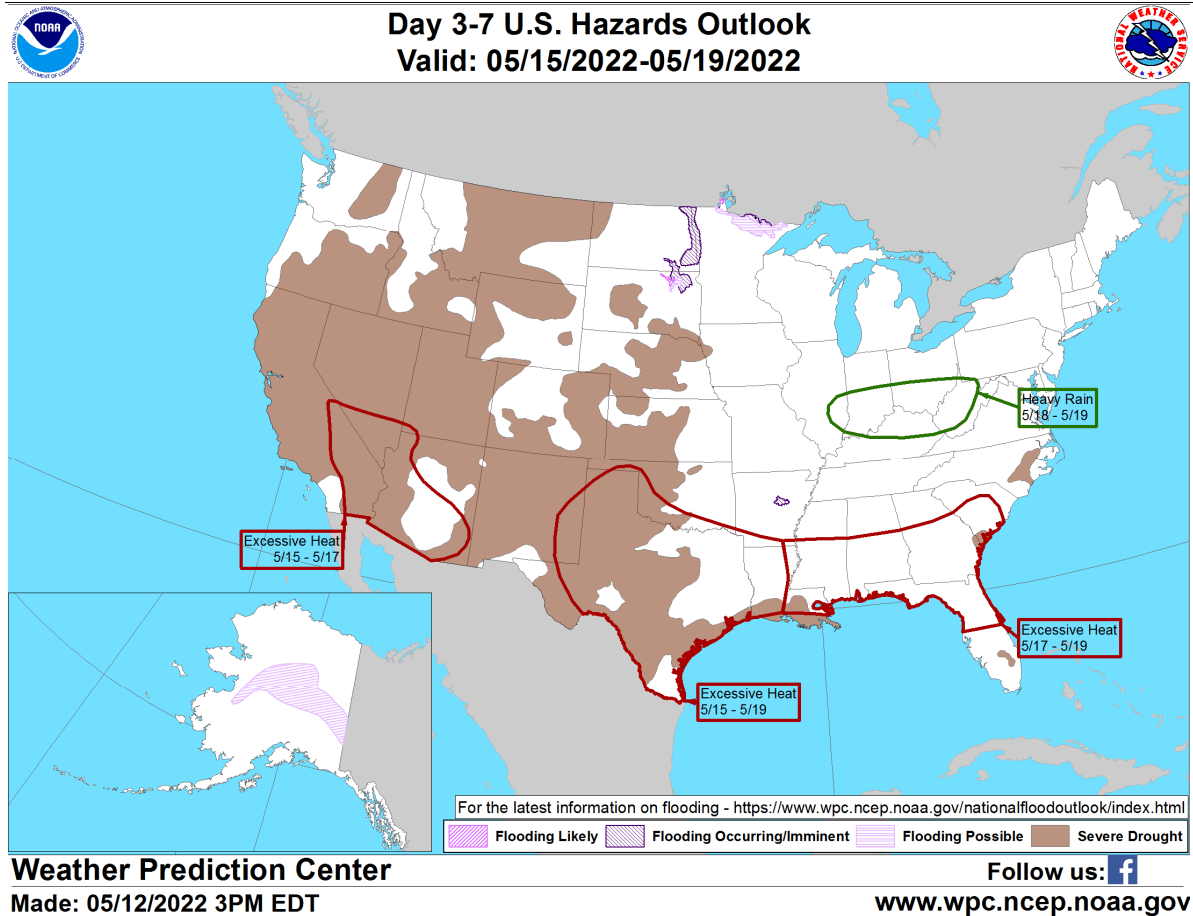
Global Earthquake Activity ($\geq M4.0$): May 6 - 12



Date (UTC)	Location	Magnitude	Epicenter
05/09/2022	24.02N, 122.50E	6.3	70 km (44 mi) SW of Yonakuni, Japan
05/09/2022	3.37S, 146.35E	6.3	17 km (11 mi) SW of Lorengau, Papua New Guinea
05/10/2022	23.61S, 66.72W	6.8	147 km (92 mi) ENE of Jujuy, Argentina

Source: United States Geological Survey

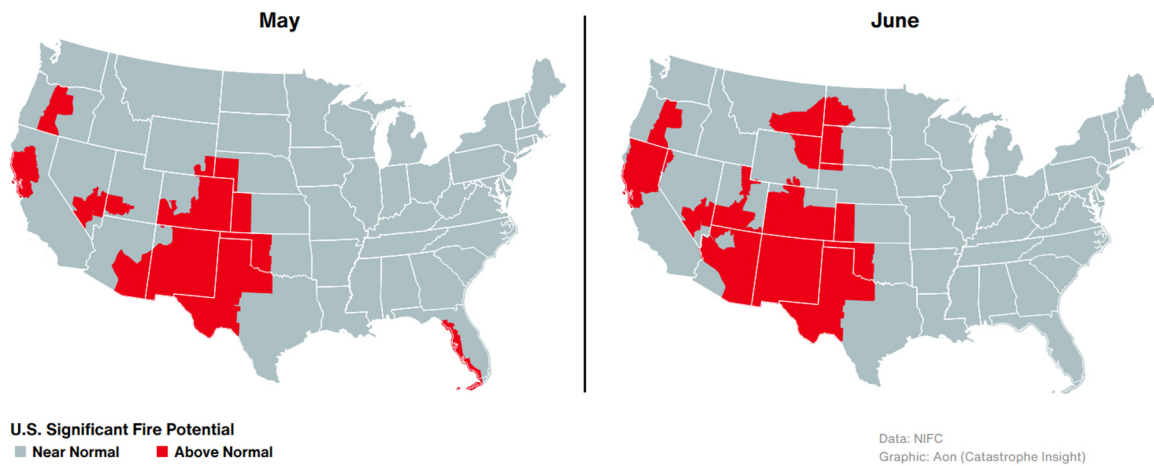
U.S. Hazard Outlook



- Upper-level ridging across the western and central United States will result in excessive heat building from the Southwest into the Southern Plains and Southeast between May 15-19. This early season heat wave will likely result in near to record breaking daily high temperature across multiple localities.
- A disturbance interacting with a stationary boundary is expected to produce heavy rainfall and thunderstorms across the Mid-Mississippi and Ohio Valleys between May 18-19.
- Overland and riverine flooding will remain a concern across the Red River Valley in the Upper Midwest throughout the medium range period.
- Extreme drought conditions continue to prevail in the West, aiding in an active start to the fire season - particularly in the Southwestern states.

Source: Weather Prediction Center (NOAA)

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



Annual YTD Wildfire Comparison: May 12

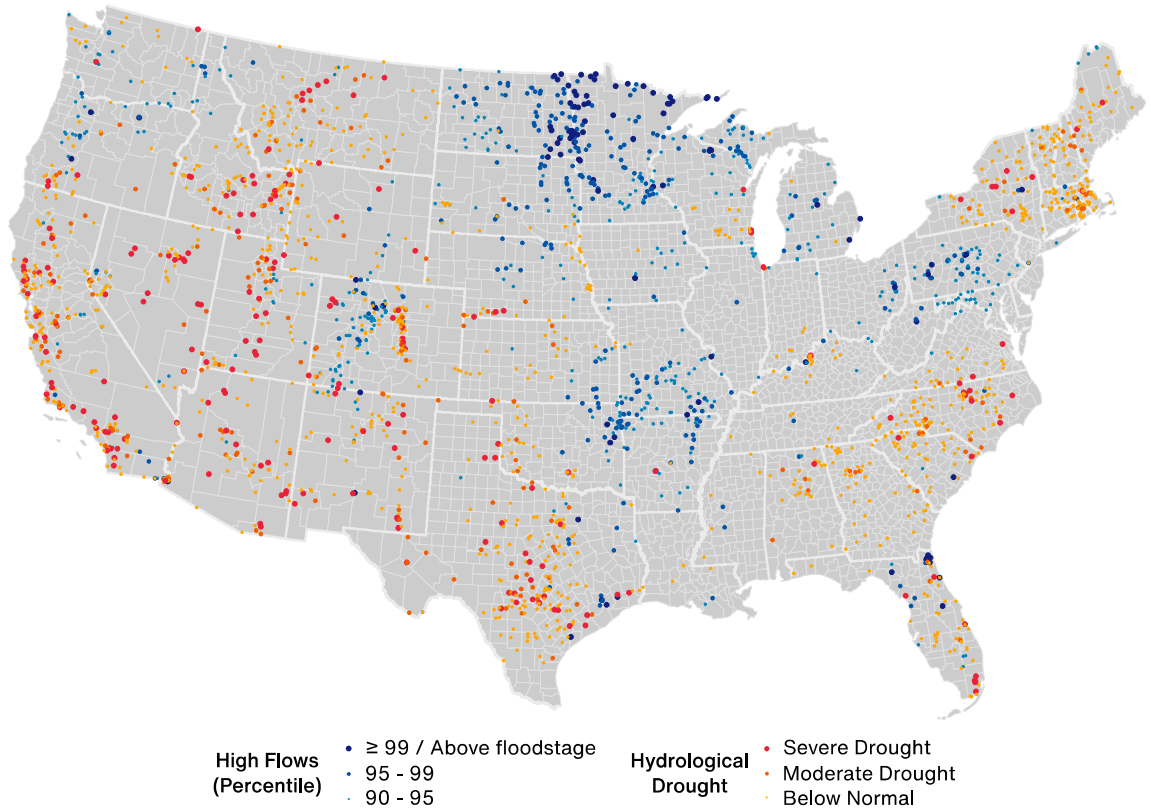
Year	Number of Fires	Acres Burned	Acres Burned Per Fire
2018	20,642	1,469,019	71.16
2019	11,981	230,462	19.24
2020	14,701	318,892	21.69
2021	20,781	547,047	26.32
2022	24,143	1,285,047	53.23
10-Year Average (2012-2021)	18,007	748,60	41.57

Top 5 Most Acres Burned by State: May 12

State	Number of Fires	Acres Burned	Acres Burned Per Fire
Texas	4,211	458,433	108.87
New Mexico	224	310,686	1,387.00
Oklahoma	962	168,029	174.67
Kansas	51	58,438	1,145.84
Mississippi	1,267	42,891	34.85

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 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.

Top 5 Rivers / Creeks: Highest Percentile for Water Height

Location	Current Stage (ft)	Percentile
Red River of the North at Fargo, North Dakota	25.16	99.17
Pembina River at Neche, North Dakota	20.66	99.13
Pigeon River at Middle Falls, Minnesota	12.06	99.00
Buffalo River near Dilworth, Minnesota	13.60	98.90
Wild Rice River near Abercrombie, North Dakota	13.79	98.89

Source: United States Geological Survey

Source Information

United States: Severe Convective Storm

U.S. National Weather Service

U.S. Storm Prediction Center

Huntington, WV, sees severe floods for 2nd time in 9 months, *Associated Press*

Damage reported in western Minnesota from thunderstorms Monday morning, *West Central Tribune*

Natural Catastrophes: In Brief

Santa Catarina Floods and Rain Leave 3 Dead, 7,500 Displaced, *Floodlist*

The number of people killed by rain in Santa Catarina rises to three, *Globo*

Flood Death Toll at 29, 40 Injured in 12 Provinces, *TOLOnews*

Shishper Glacier outburst sweeps away bridge in Hassanabad area of Hunza, *Dawn*

Torrential rain inundates South, causes flash flooding in North, *Nation Thailand*

Asani outer band triggers heavy rainfall in Kolkata, *Times of India*

China activates Level-IV emergency response for floods, *Xinhua*

Flood waters encroach on homes in South Fargo, *Valley News Live*

Southern Manitoba communities brace for more rain amid worst flood in years, *CBC*

Major flooding in Queensland as more rain threatens communities, *Nine News*

Coastal Fire destroys at least 20 homes in Laguna Niguel, *CBS News*

InciWeb

The California Department of Forestry and Fire Protection (Cal Fire)

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