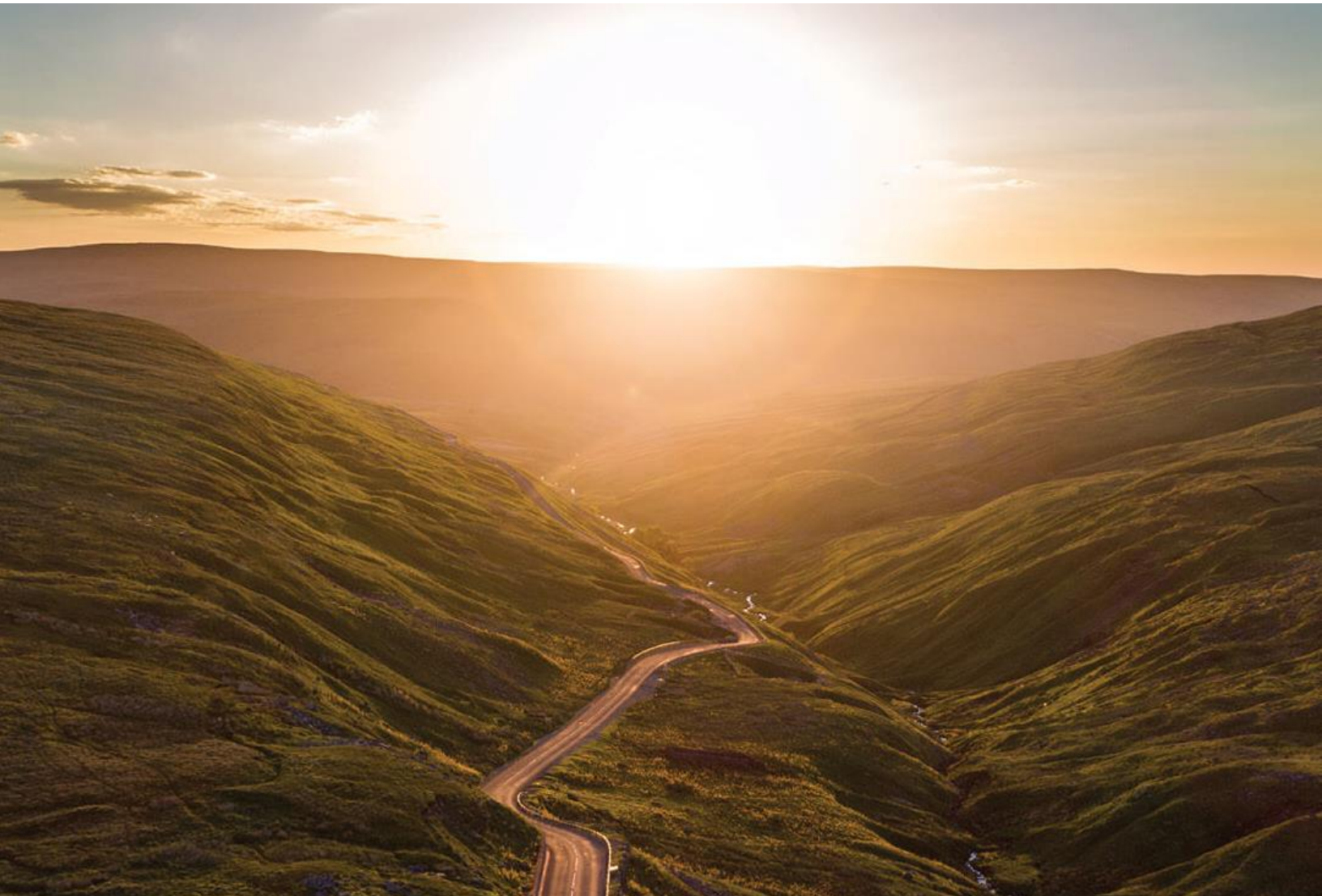


AON

Weekly Cat Report

June 14, 2024



Europe: Severe Convective Storm & Flooding

Overview

A multi-day outbreak of severe weather affected several countries in Central Europe, as a stagnant frontal boundary developed in the region and abundant moisture and instability allowed for the development of storm systems, and locally damaging supercells. Most of the impacts were associated with large hail, additionally with heavy rain and strong winds. Aggregated economic and insured losses from the outbreak are expected to reach into the hundreds of millions EUR.

Meteorological Recap

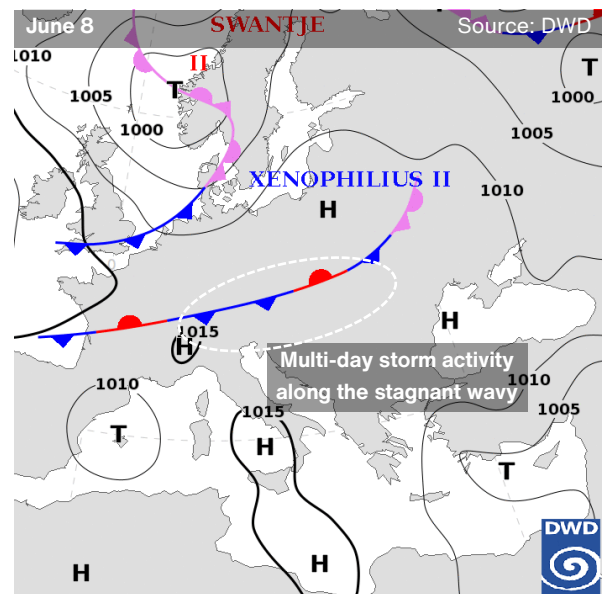
Since June 6, a large area of low pressure, roughly centred above the Norwegian Sea, has built up over northern Europe and with ridges on both sides, framed a synoptic situation that led to a multi-day outbreak of hazardous weather, particularly in Central Europe. The situation allowed for an advection of warm air, relatively high temperature gradient, abundant moisture and for high instability. The extensive cold front to the south of the low-pressure area gradually developed into a stagnant, wavy frontal boundary.

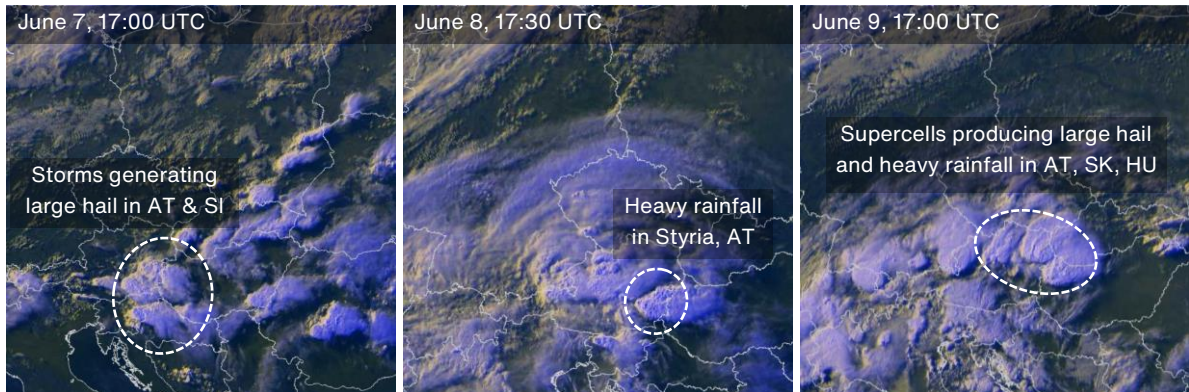
Over the following days on June 6-9, an active severe weather pattern continued to affect large portions of Europe, with slow-moving frontal waves initiating rounds of storms in various regions, primarily in Central Europe.

A similar situation continued on June 10-13, with a gradual weakening of the established stagnant pattern and the arrival of a better-defined low-pressure area Uljana. Most of the thunderstorm activity focused further southeast in the Balkans.

Most of the impacts on June 6-9 across Central Europe were associated with large hail. There were several individual storm cells or clusters that resulted in notable or significant losses. On **June 7**, a storm producing very large hail with diameters of up to 6 cm (2.4 in) occurred in southern Styria in Austria and later continued to affect the area south of Maribor in Slovenia. Other notable clusters of hail impacts occurred in western Slovakia in Bratislava and Trnava regions, in northern suburbs of Budapest in Hungary, as well as on the southern outskirts of Munich in Germany.

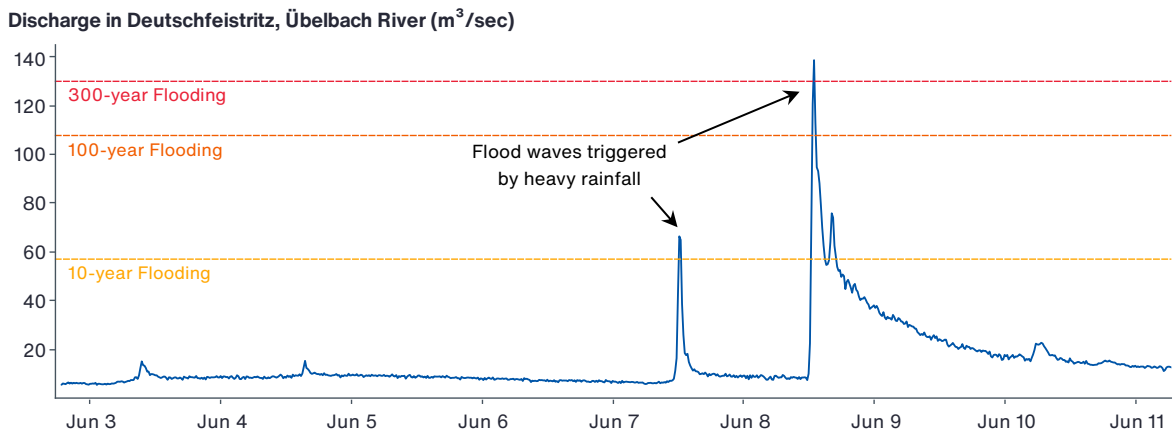
On **June 7-9, eastern Austria** (federal states of Styria, Burgenland and Lower Austria) experienced a particularly notable episode of large hail, with additional impacts from strong winds and heavy rain. More than 100 mm (3.9 in) of rain fell locally within several hours in Styria; 141 mm (5.6 in) was recorded in Stübing. Other notable episodes included damaging hail in southern Germany on June 8 (southeast of Ulm) and in Switzerland on June 9 – with large hail observed at the foothills of Jura and around Brienersee.





Hydrological Recap

While spatially limited, the heavy rainfall episode in eastern Austria was regionally significant. For example, the intense precipitation on June 8 triggered flash flooding on the Übelbach River that exceeded the threshold for 1-in-300-year flooding (see the Graphic below).



Event Details

Austria

Two people were killed, and particularly notable damage was incurred in eastern Austria during a multi-hazard episode on June 7-9. Localized, damaging flash flooding occurred in Styria – in Deutschfeistritz, a 1-in-300-year event was recorded on a local gauging station and subsequent flash flooding swept cars and inundated dozens of homes. Localized flash flooding was also reported from various parts of Burgenland on June 8. A state of emergency was declared in the Styrian County of Hartberg-Fürstenfeld. On June 8-9, the Styrian fire services intervened more than 980 times, including about 130 operations in Graz alone. However, significant damage was expected to stem from multiple rounds of hailstorms. This included 6-cm (2.4-in) hail between Deutschlandsberg in Styria and Maribor in Slovenia on June 7, and on June 9 between Vienna and Wiener Neustadt, as well as around Hartberg and Oberwart. During one of the storms, an aircraft travelling to Vienna was damaged by large hail shortly before landing.



Flash flooding in Deutschfeistritz, Styria
Source: Styrian Fire Brigade Association



Hail damage on aircraft at Vienna Airport
Source: Aviation Security

Elsewhere

Notable hail and wind-related damage was also observed in multiple other countries. In Hungary, a tornado damaged several houses in Narda on June 9. Very large hail resulted in notable damage in eastern Slovenia around Maribor and hailstorms also affected parts of western and southern Slovakia.

Further impacts were observed in the Balkan region. Damaging wind gusts and large hail of up to 5 cm (2 in) were observed in Romania, severe thunderstorms accompanied by intense winds and hailstones of size up to 7 cm (2.8 in) in diameter resulted in motor damage and caused notable crop losses in parts of Bulgaria.

Hail-related damage was reported also in southern Germany on June 8-9. This region is still recovering from recent damaging floods that hit the states of Bavaria and Baden-Württemberg. According to the latest figures estimated by the German Insurance Association, insured losses from the flooding are expected to be around €2 billion.

Financial Loss

Aggregated economic and insured losses from the thunderstorm activity across multiple European countries are estimated to reach into the hundreds of millions of EUR. A particularly costly episode occurred in Eastern Austria on June 8-9, with hailstorms in Germany, Slovenia, Switzerland and elsewhere incurring additional losses.

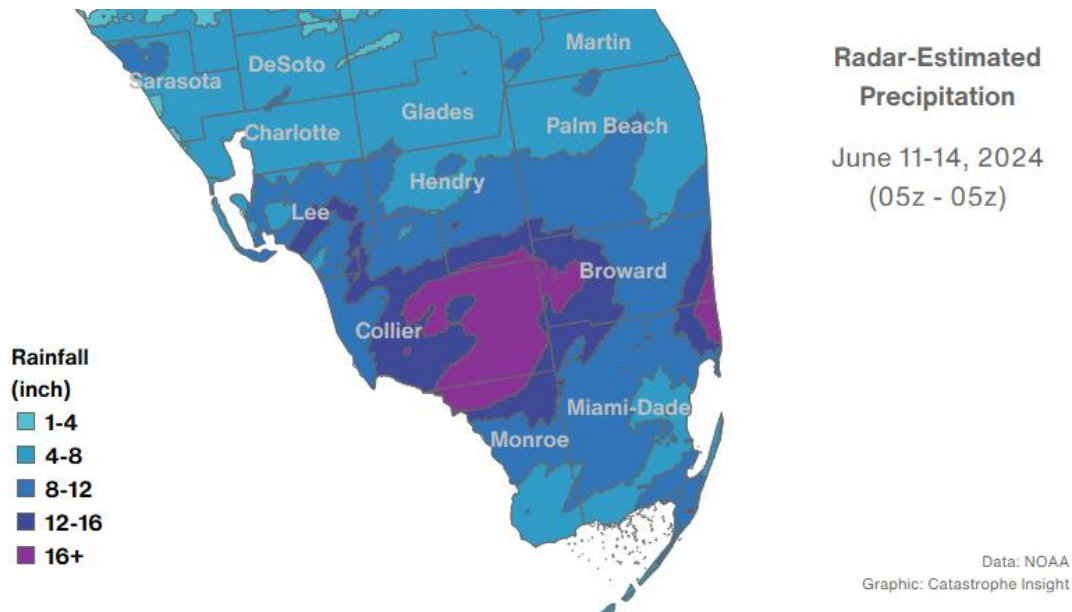
United States: Flooding & Severe Convective Storm

Overview

A prolonged, excessive rainfall event triggered significant flash flooding over Southern Florida since June 11. The large urban corridor from Miami to Fort Lauderdale was especially impacted as flood waters inundated numerous homes, vehicles, and roadways. Additionally, scattered severe weather over the past week affected various parts of the central and southern United States. Total economic and insured losses could reach into the hundreds of millions USD, possibly higher.

Meteorological Recap

Flooding

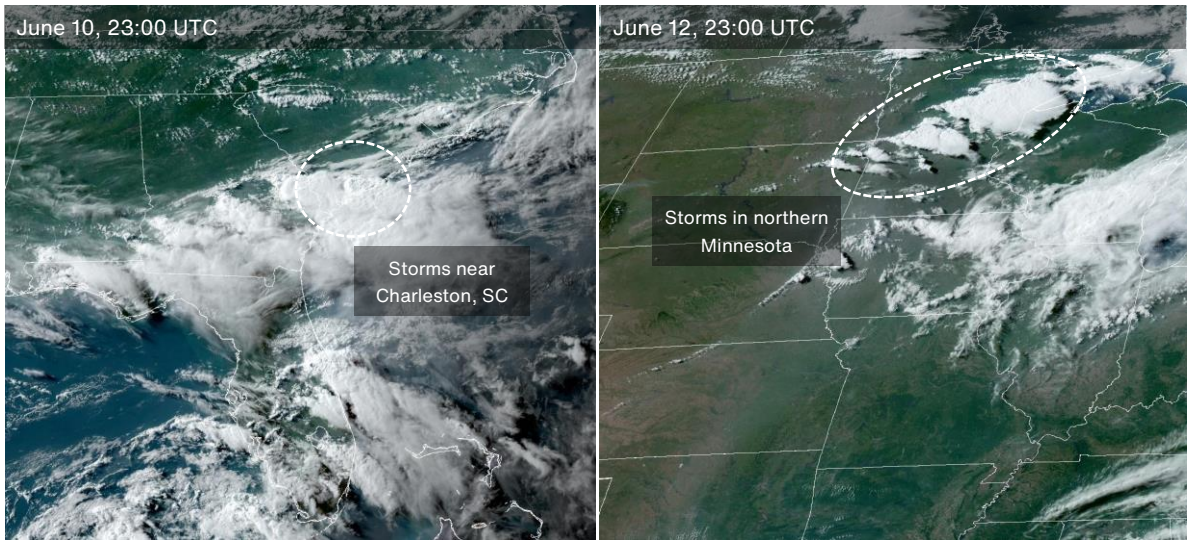


After suffering from persistent drought conditions in recent weeks, much of southern Florida has now experienced torrential rainfall since June 11. Abundant moisture from the Caribbean Sea converging along a stationary front has led to continuous, heavy rainfall over the southern half of the state. A slow-moving, tropical low-pressure system also aided storm development over this region. As a result, at least 8 million people within this highly urbanized area were under flood alerts from the National Weather Service (NWS).

Several areas within Broward, Miami-Dade, Collier, Hendry, and Sarasota counties have received well over 1 foot (305 mm) of rainfall since the event began. One of the hardest-hit cities was Sarasota, which recorded nearly 4 inches (102 mm) of rain in one hour late on June 11. In southeast Florida, the NWS also issued a flash flood emergency for urban locations in Broward and Miami-Dade counties on June 12. This included cities such as North Miami, Hallandale Beach, and Hollywood, which saw nearly 1 foot (305 mm) of rain on June 12 alone, according to preliminary NWS estimates.

At the time of writing, intense rain continues to fall over much of southern Florida, and impacts may persist through at least June 15. Any additional developments in the affected area will be covered in the next Weekly Cat Report.

Severe Weather



Across parts of the central and southern United States, scattered incidents of severe weather occurred from June 6-12. Strong storms with 60 mph (97 kph), heavy rain, and a few tornadoes first impacted central Florida late on June 6. Then, several additional rounds of intense storms struck the central and southern U.S. on June 7-10. Reports of wind gusts over 70 mph (113 kph), hail at least 2.5 inches (6.4 cm) in diameter, and heavy rainfall primarily came from Colorado, Kansas, Nebraska, Texas, Georgia, and South Carolina. Eastern Colorado was especially impacted as storms generated 100 mph (161 kph) gusts and 3-inch (7.6 cm) hail. More notable impacts were seen in the Charleston, South Carolina metro area due to a downburst generating straight-line wind gusts up to 85 mph (137 kph).

After minimal impacts on June 11, more severe weather developed on June 12-13. Numerous strong storms affected multiple communities within Minnesota, Iowa, Kansas, Missouri, Illinois, Indiana, and Michigan. Storms featuring powerful winds, large hail, and tornadoes were especially common in northern Minnesota, particularly near the counties of Aitkin, Crow Wing, and Carlton.

Event Details

Florida

The urban coastal regions within the southern Florida Peninsula experienced significant flash flooding impacts. Local officials declared a state of emergency for Broward, Miami-Dade, Sarasota, Collier, and Lee counties due to major flooding. Multiple cities such as Miami, Hollywood, Sarasota, Aventura, Siesta Key, Fort Lauderdale, and Hallandale Beach saw widespread inundated roads, homes, and businesses. Hundreds of flights were delayed or canceled, over 300 flooded vehicles were towed, and at least 70 people were rescued from flood waters.

Aside from flooding impacts, severe weather on June 6 also affected parts of central Florida. This included the Orlando metro area, where strong wind gusts led to one death, downed trees, and some property damage.

Central and Southern U.S.

Scattered severe weather over the past week generated notable impacts in various locations across the central and southern United States. A strong downburst over the Charleston, South Carolina metro area led to straight-line wind damage, particularly within the northern communities. This included the towns of Summerville, Ladson, and Goose Creek which saw numerous downed trees leading to 1 injury and many damaged homes and vehicles.



Straight-line wind damage in eastern Colorado

Source: NOAA DAT

Additionally, Aitkin, Crow Wing, and Carlton counties in northern Minnesota also experienced notable severe weather impacts. Powerful winds led to property damage, including flipped trailers and boats, across towns such as Brainerd, Aitkin, and Crosby.

In eastern Colorado, strong winds caused property damage primarily within rural communities. Some limited material losses due to localized flooding and hail impacts were also seen closer to the Denver metro area.

Financial Loss

Most financial losses from the previous week of extreme weather within the United States will likely come from the significant, ongoing flooding in southern Florida. These impacts, along with the severe weather-related damages in recent days, may drive total economic and insured losses into the hundreds of millions USD. Total losses may further increase as the situation in southern Florida continues to unfold.

Natural Catastrophes: In Brief

Severe Convective Storm, Flooding, & Landslide (Chile)

Multiple frontal systems since June 4 have impacted parts of central Chile, bringing intense storms, flooding, and landslides. The Ñuble, Biobío, Araucanía, Los Ríos, and Maule Regions were among the worst affected as over 60,000 people lost power. According to SENAPRED, there are numerous reports of localized flooding, blocked roads, and suspension of classes. One person has been killed, over 1,200 people have been impacted, and around 2,300 homes have been damaged in the affected regions.

Flooding & Landslide (Indonesia)

Since June 4, periods of heavy rainfall have led to flooding and landslides in parts of southern and central Indonesia. According to BNPB, heavy rain over the South Kalimantan Province triggered flooding along the Batulicin, Sebamban, Satui, and Kusan rivers. Several nearby districts were heavily impacted as roughly 3,080 homes and 845 hectares (2,100 acres) of crops were inundated. Additionally, 6 people were killed due to separate landslide events in the East Nusa Tenggara and East Java Provinces.

Severe Convective Storm (Pakistan)

On June 5, intense thunderstorms brought notable impacts to parts of eastern Pakistan, particularly the Punjab Province. Heavy rain, large hail, and lightning strikes within the Gujranwala and Khushab Districts led to six deaths. Another 43 people were injured in Narowal and Sialkot due to strong winds knocking down utility poles, walls, and trees.

Heatwave & Wildfires (Eastern Mediterranean)

A strong heatwave has brought extreme temperatures to much of the eastern Mediterranean region since June 12. Schools and tourist areas were shut down as temperatures reached nearly 40°C (104°F) in Athens, Greece on June 12. Similar temperatures were recorded in Turkey, particularly within the Manisa, Aydın, and İzmir provinces. On June 7, Aswan station in Egypt reached 50.9°C (123.6°F), setting the highest reliable temperature ever recorded in the country and marking the hottest June day in Africa. Cyprus also experienced its hottest June day, with temperatures hitting 44°C (111.2°F).

Additionally, warm and dry weather over this region enhanced conditions for wildfire development. The worst effects were reported in western Cyprus, where a wildfire has been burning in the Paphos district, burning an area of more than 1,400 hectares (3,460 acres) and prompting population evacuations.

Flooding (Guatemala)

Heavy rainfall and flooding have impacted several parts of Guatemala since early June, particularly in the departments of Suchitepéquez, San Marcos and Guatemala. According to the National Coordinator for Disaster Reduction (CONRED), 3 people have died, 4 others have been injured, and more than 600,000 have been affected. Severe floods have damaged more than 700 houses.

Flooding & Landslides (Vietnam, Thailand)

Almost 10,000 people were affected by flooding and landslides across northern Vietnam on June 8-11. Provinces of Dien Bien, Lao Cai, Ha Giang, Yen Bai, Cao Bang, Lang Son, Thai Nguyen, Bac Giang, Quang Ninh and Hai Phong were among the worst affected. At least 3 people died and more than 2,400 houses were inundated. Widespread flooding caused notable infrastructural and agricultural damage across the aforementioned provinces, according to the ASEAN Disaster Information Network (ADINet). Some losses and additional thousands of affected people were reported in Thailand's Chanthaburi province.

Flooding (Spain)

In eastern Spain, heavy rainfall on June 10-12 triggered flash flooding incidents within the Murcia Region and Mallorca Island. The municipalities of Calasparra and Altiplano within Murcia were among the worst impacted as flooding caused considerable damage to infrastructure and 15,000 hectares (37,000 acres) of crops. Local EM officials in Murcia also responded to over 200 flooding incidents. In Mallorca, nearly 72 mm (2.8 inches) of rain fell in 4 hours at Palma de Mallorca Airport, which led to flooding and delays for dozens of flights. Economic losses on agriculture alone were estimated in the tens of millions of EUR.

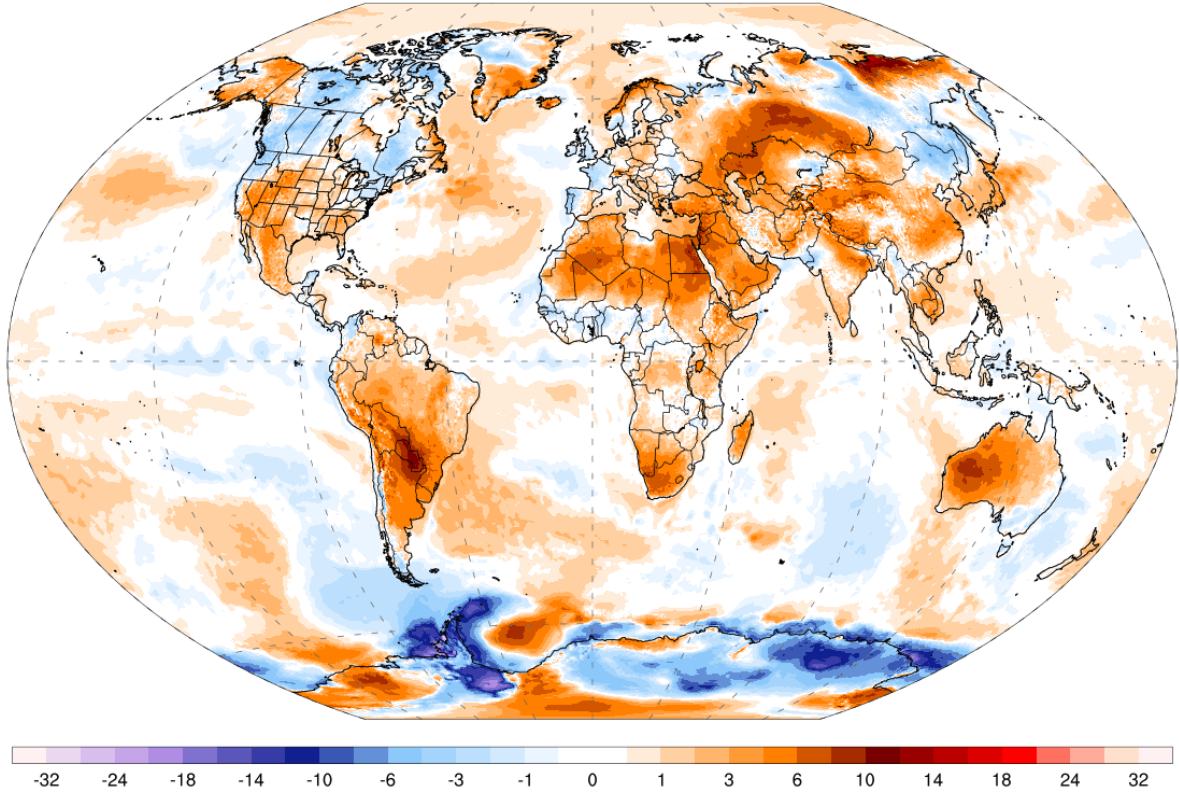
Wildfire (United States)

The Rose Fire near Wickenburg, Arizona, a town just northeast of Phoenix, began on June 12 amid an ongoing heatwave in the southwest United States. As of late June 13, the fire was 20% contained after burning roughly 166 acres (67 hectares) of land. Despite the small size of the fire, 15 structures have already been burned down, including 7 homes. An additional 13 vehicles were also destroyed by the flames, according to Maricopa County officials.

Global Temperature Anomaly Forecast

GFS 2m T Anomaly (°C) [CFSR 1979-2000 baseline]
Days 1-3 Avg | Fri, Jun 14, 2024

ClimateReanalyzer.org
Climate Change Institute | University of Maine

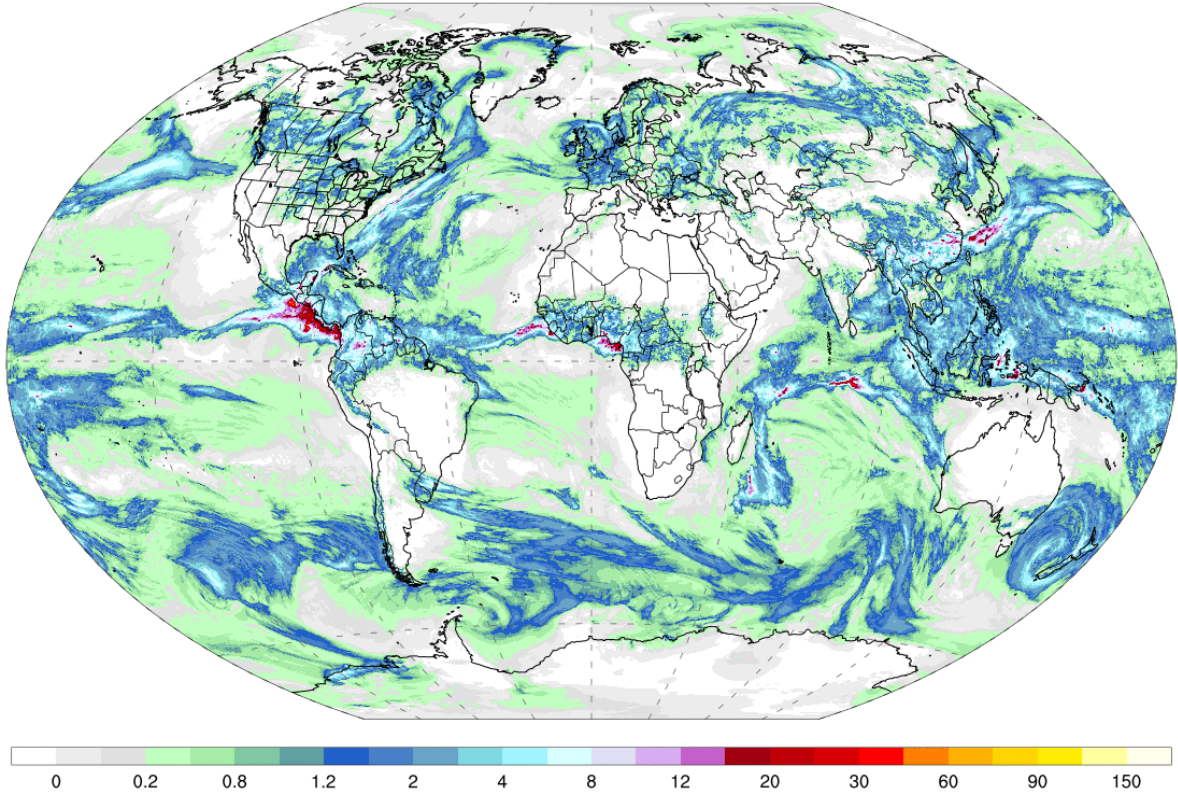


Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

Global Precipitation Forecast

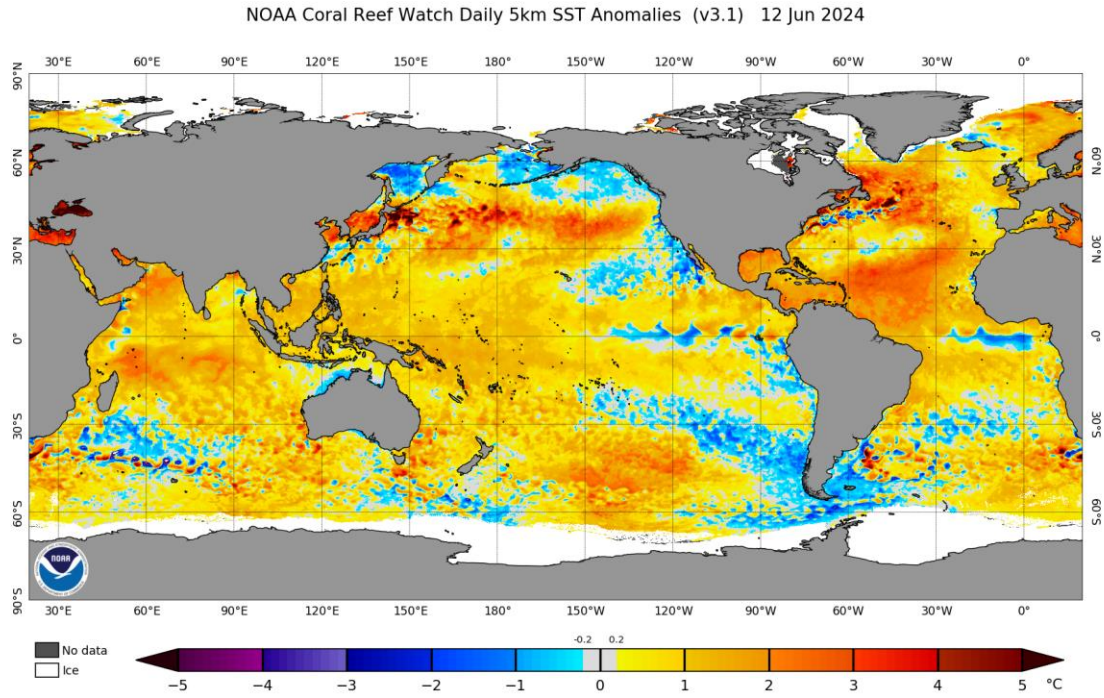
GFS Accumulated Precipitation (cm)
Days 1-3 Total | Fri, Jun 14, 2024

ClimateReanalyzer.org
Climate Change Institute | University of Maine



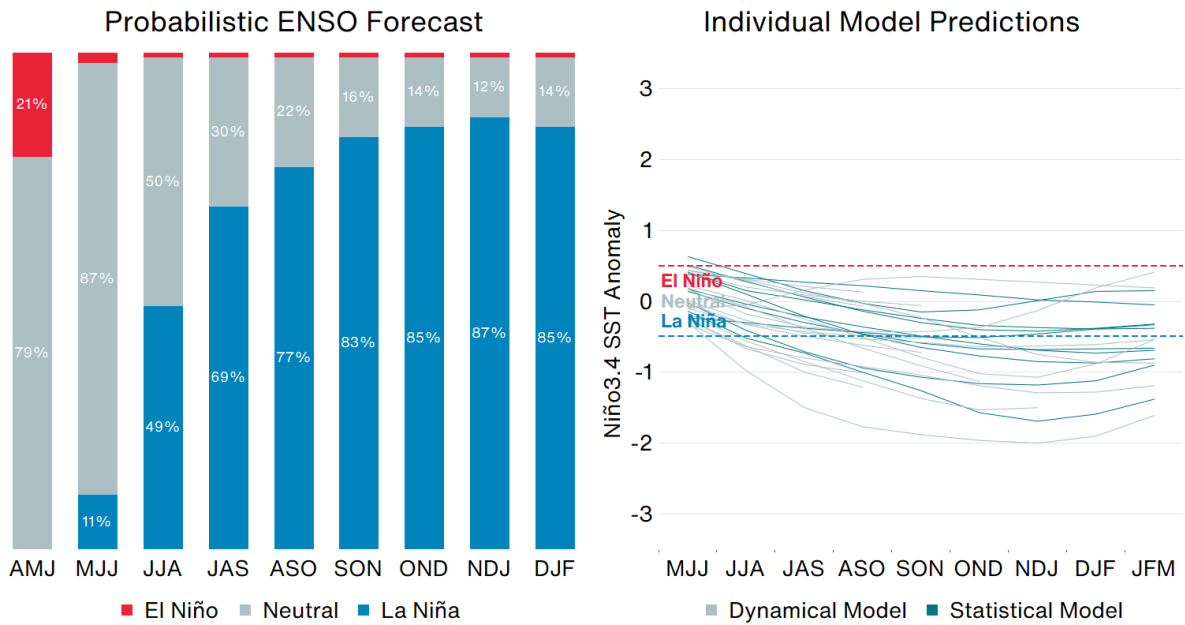
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

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



El Niño-Southern Oscillation (ENSO)

Probabilistic ENSO Model Projections: May 2024



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

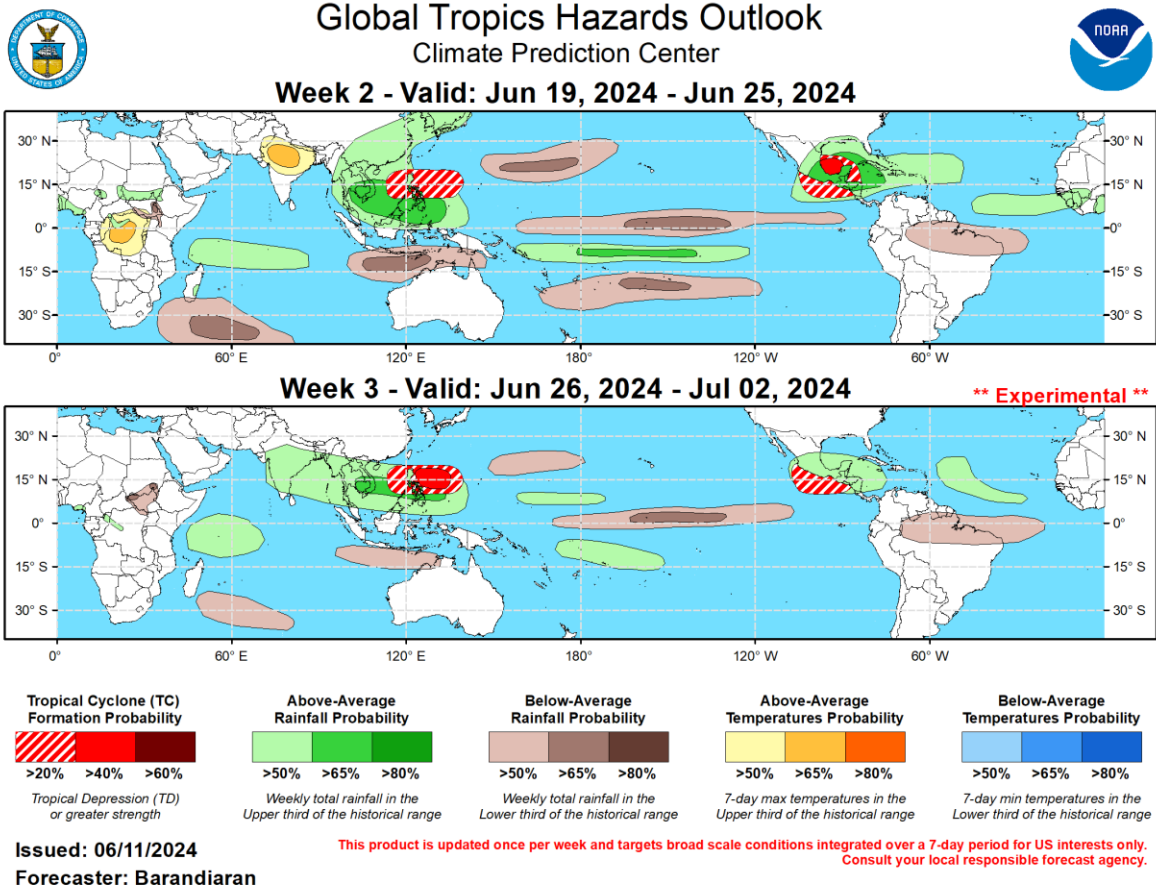
La Niña: Cool phase of an ENSO cycle. Sea surface temperatures of -0.5°C occur across the east-central equatorial Pacific.

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).

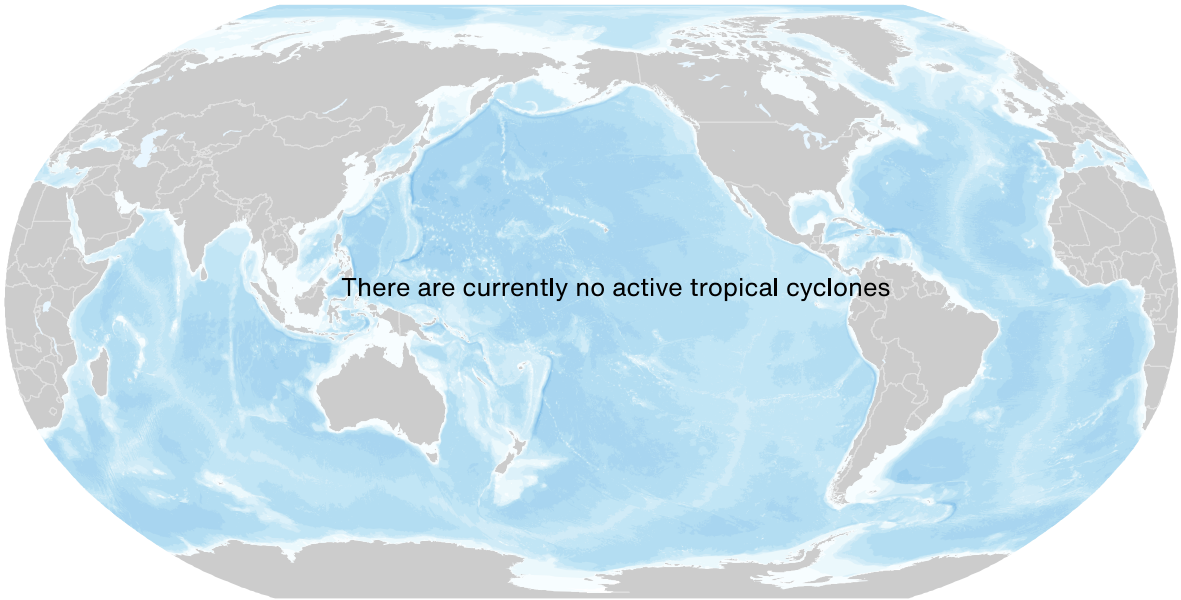
Source: NOAA, Columbia University | Graphic: Aon Catastrophe Insight

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

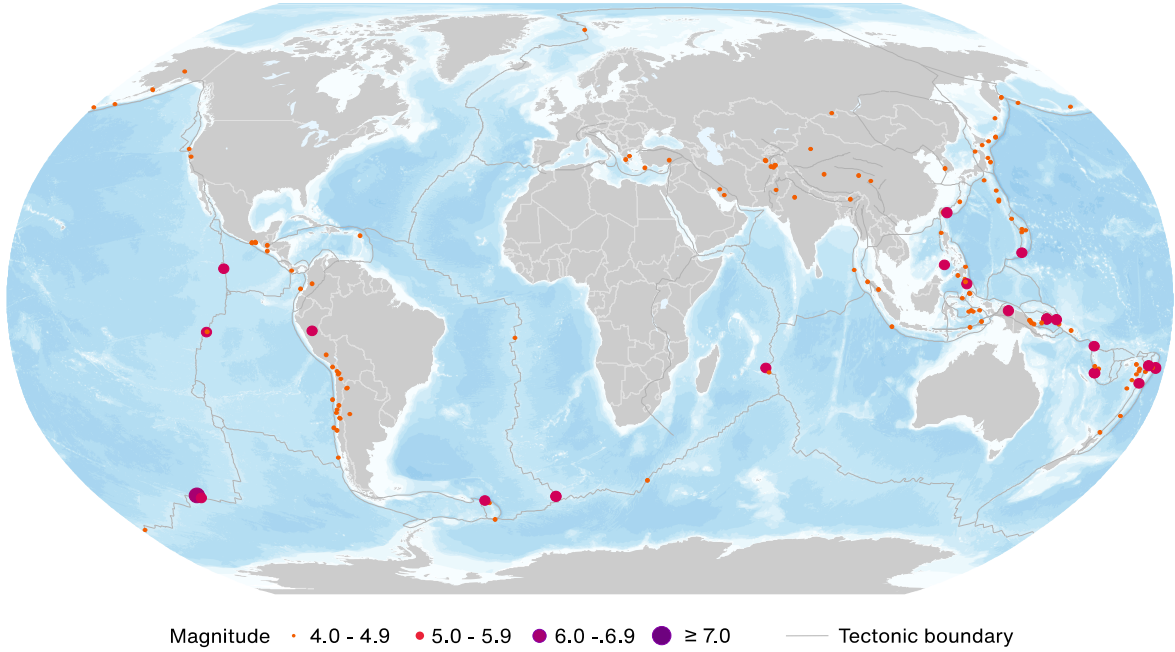
Name	Location	Winds	Center

* 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)

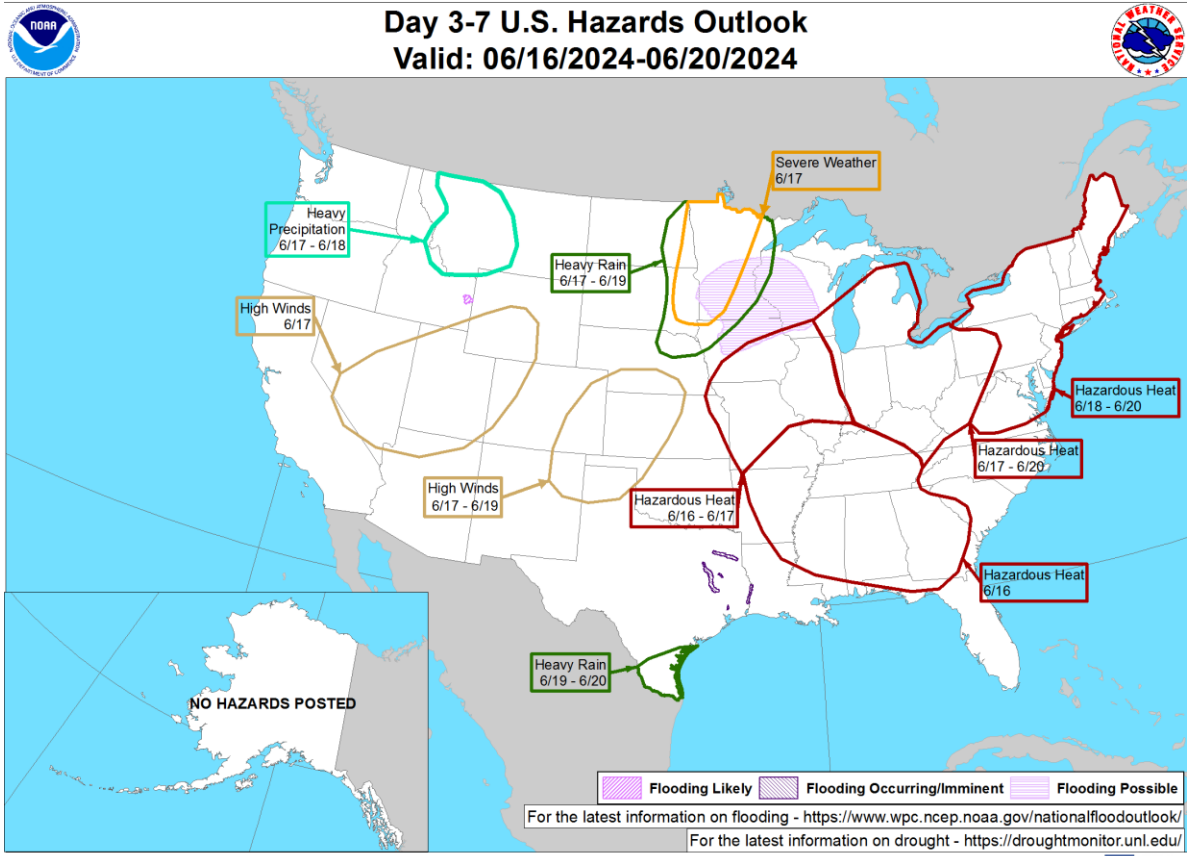
Global Earthquake Activity ($\geq M4.0$): June 7-13



Date (UTC)	Location	Magnitude	Epicenter
6/9/2024	53.86S, 133.99W	6.2	Pacific-Antarctic Ridge

Source: United States Geological Survey

U.S. Hazard Outlook

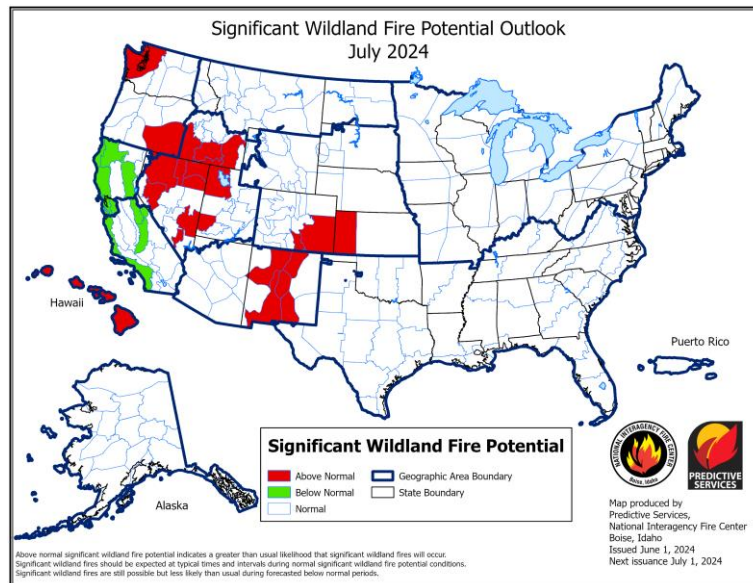
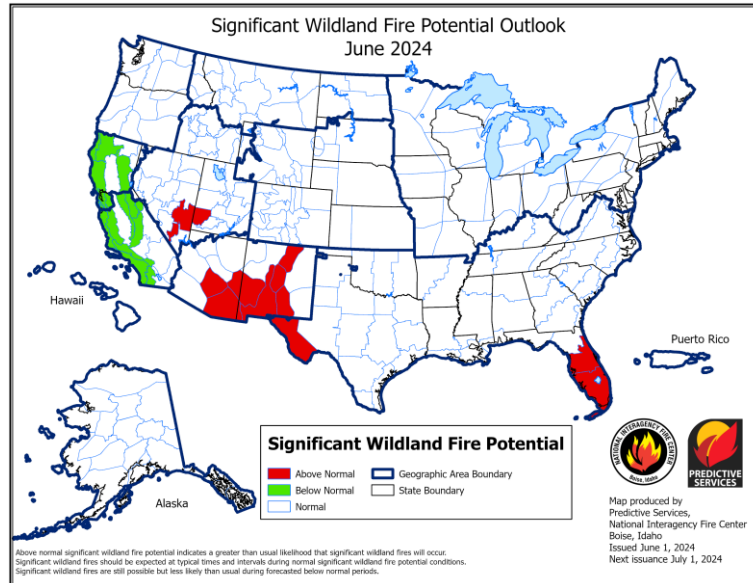


Weather Prediction Center
Made: 06/13/2024 03:22 PM EDT

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

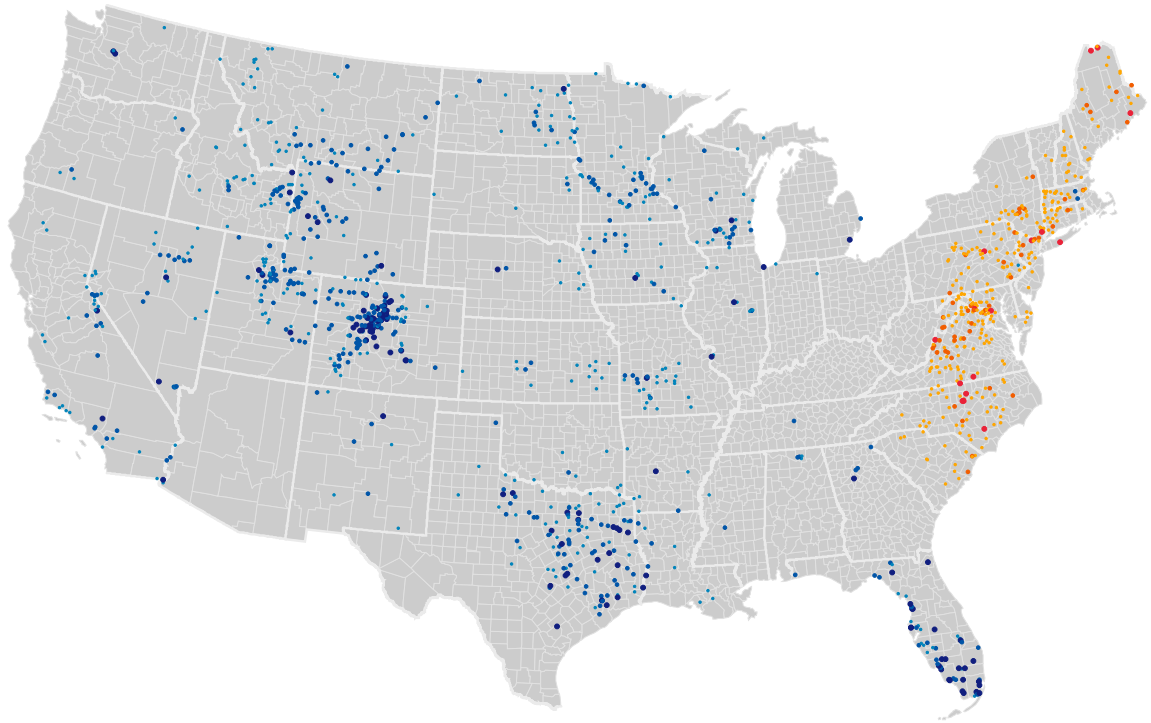
Source: Climate Prediction Center (NOAA)

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



Source: NIFC

U.S. Current Riverine Flood Risk



- | | | | |
|--------------------------------|---|-----------------------------|--|
| High Flows (Percentile) | <ul style="list-style-type: none">• ≥ 99 / Above floodstage• 95 - 99• 90 - 95 | Hydrological Drought | <ul style="list-style-type: none">• Severe Drought• Moderate Drought• Below Normal |
|--------------------------------|---|-----------------------------|--|

A $\geq 99^{\text{th}}$ percentile indicates that estimated streamflow is greater than the 99th percentile for all days of the year. This methodology also applies for the other two categories. A stream in a state of severe drought has 7-day average streamflow of less than or equal to the 5th percentile for this day of the year. Moderate drought indicates that estimated 7-day streamflow is between the 6th and 9th percentile for this day of the year and 'below normal' state is between 10th and 24th percentile.

Source: United States Geological Survey

Source Information

Europe: Severe Convective Storm & Flooding

European Severe Weather Database (ESWD)

Impact Forecasting Automated Event Response (AER)

Provincial Government of Styria

Flash flood swept away cars in Deutschfeistritz, *Kleine Zeitung*

United States: Flooding & Severe Convective Storm

National Weather Service (NWS)

Storm Prediction Center (SPC)

Sarasota Rainfall Broke Records In 'Thousand-Year Storm': Officials, *Patch*

Florida braces for more rainfall after days of intense downpour and flash flooding, *NBC News*

Florida thunderstorm knocks gas station canopy onto car near Orlando, *Fox Weather*

Aurora, Centennial, Parker hit by heavy rain, hail and lightning, *9News*

'This storm is the worst I've seen': Hail pummels Eastern Colorado farm, *Denver7 ABC*

GALLERY: Storms damage communities across Minnesota; NWS teams out surveying damage, *KSTP*

Strong storms, including 2 confirmed tornadoes, hammer communities north of the Twin Cities, *CBS*

Supercell thunderstorm rips across upper Lowcountry, bringing damage and golf ball hail, *The Post and Courier*

Natural Catastrophes: In Brief

Chile Ministry of the Interior and Civil Protection (SENAPRED)

Guatemala's Coordinator for Disaster Reduction (CONRED)

National Agency for Disaster Countermeasure (BNPB)

ASEAN Disaster Information Network (ADINet)

Arizona Department of Forestry and Fire Management

2 days of administrative leave given in Turkey's western Manisa due to scorching heat, *Duva English*

Heat wave in Greece halts visits to Acropolis as drones with thermal cameras monitor temperatures, *AP News*

Six killed, 40 injured as storm brings havoc in Punjab, *Dawn*

Storms in Chile damage homes, flood roads and leave at least 1 person dead, *ABC News*

Rains in Bío Bío: threat of river overflow in Arauco and flooded areas in Santa Juana and Concepción, *BioBioChile*

Planes grounded as sudden storm floods runways at Spanish airport, *CNN*

Fires, floods and heatwaves plague Europe as extreme weather persists, *Euro News*

Contacts

Michal Lörinc

Head of Catastrophe Insight

michal.lorinc@aon.com

Ondřej Hotový

Catastrophe Analyst

ondrej.hotovy@aon.com

Antonio Elizondo

Senior Scientist

antonio.elizondo@aon.com

Tomáš Čejka

Catastrophe Analyst

tomas.cejka@aon.com

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