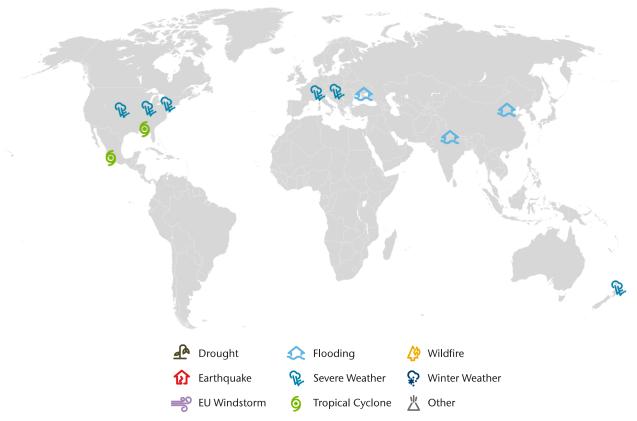


Weekly Cat Report

June 25, 2021

This Week's Natural Disaster Events



Event	Impacted Areas	Fatalities	Damaged Structures and/or Filed Claims	Preliminary Economic Loss (USD)*	Page
Severe Weather	United States	1	Thousands	100s of millions	3
Severe Weather	Western & Central Europe	5	10s of thousands	100s of millions	х
TS Claudette	United States	14	Thousands	Millions	Х
TS Dolores	Mexico	3+	Hundreds	Millions	Х
Flooding	India	22+	1,325+	Millions	Х
Severe Weather	New Zealand	1	Hundreds	Millions	Х
Flooding	Ukraine	1	400+	76+ million	Х
Flooding	China	0	Thousands	10s of millions	Х

*Please note that these estimates are preliminary and subject to change. In some instances, initial estimates may be significantly adjusted as losses develop over time. This data is provided as an initial view of the potential financial impact from a recently completed or ongoing event based on early available assessments.

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: <u>http://catastropheinsight.aon.com</u>

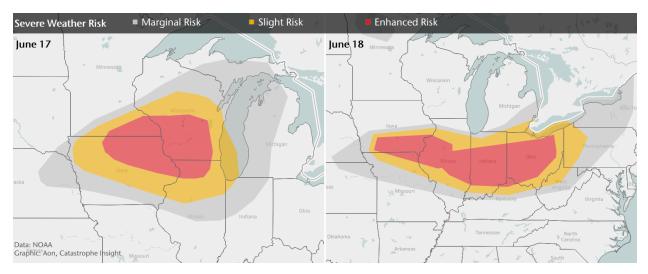
Active week of severe weather impacts much of the U.S.

Multiple days of unsettled weather across the central and eastern United States were fueled by warm temperatures and an abundance of atmospheric moisture. A series of upper level disturbances and slow-moving frontal boundaries generated widespread reports of large and damaging hail, severe straight-line winds, life-threatening flooding, and dangerous tornadoes between June 17-21. One fatality in Indiana was linked to flash-flooding which occurred on June 18-19. A severe line of storms spawned a powerful EF-3 tornado on June 20, resulting in extensive damage to hundreds of homes in densely populated suburbs southwest of Chicago - in DuPage and Cook Counties. Total combined economic and insured losses during the past week were each anticipated to reach into the hundreds of millions (USD).

Meteorological Recap

June 17-18

The Storm Prediction Center (SPC) issued an Enhanced Risk (level 3 out 5) for severe weather across portions of the Upper Mississippi Valley and Midwest, centered on northern Iowa, southern Minnesota, southwestern Wisconsin, and northern Illinois on June 17. Severe storm development was aided by an approaching mid-level disturbance and southeastward sinking cold frontal boundary. Throughout the day, warm and dry air originating from higher elevations across the Southwest and central Rockies advected toward the Upper Midwest. This elevated layer acted as a cap which initially suppressed convective activity. However, throughout the day the cap eroded with assistance from ample daytime heating and the approaching mid-level disturbance. This allowed for robust convective development into the evening and overnight hours. Instability was further enhanced by rich low-level moisture, steep mid-level lapse rates (changes in temperature with height), and favorable wind shear (change in wind speed and/or direction with height). Clusters of supercells generated multiple reports of very large hail (greater than or equal to 2.0 inches, 5.1 centimeters in diameter), primarily in regions of southeastern Minnesota and west-central Wisconsin.



The main severe weather threat shifted southeastward on June 18, where the SPC issued an Enhanced Risk (level 3 out 5) for severe storms centered across a corridor spanning from the Midwest into the Ohio Valley. In the wake of morning convective activity, the environment across the warm sector was characterized by extremely hot and humid conditions associated with a southwesterly low-level jet.

Weekly Cat Report

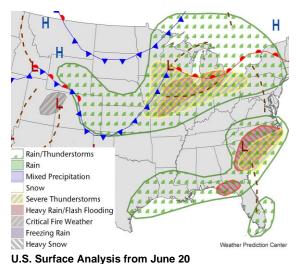
Further destabilization was fueled by strong daytime heating and steep mid-level lapse rates (changes in temperature with height). Severe storm development was aided by an approaching cold front and outflow boundaries from previous convective activity. Severe storms spawned a pair of EF-2 tornadoes near the Indiana and Ohio border in the late afternoon. By the evening, multiple rounds of south-southeastward propagating cells organized along boundaries spanning from Iowa into the Ohio Valley. Straight-line winds and very large hail were the primary hazards associated with these storms. Heavy rainfall rates generated instances of flooding and flash-flooding, particularly across regions of central and southern Indiana. 24-hour radar estimated rainfall totals in portions of Indiana approached and exceed 6 to 8 inches (150 to 200 millimeters) by the morning of June 19.

June 19

Severe weather on June 19 across the Middle Mississippi Valley and Central Plains was focused in the vicinity of a quasi-stationary frontal boundary, and a deepening area of surface low pressure in the Northern High Plains. At the upper levels, the environment was characterized by increasing mid-latitude westerly flow and an embedded short-wave disturbance, while the previously dominating ridge began to weaken and retreat toward the Desert Southwest. The SPC highlighted a main corridor extending from the Central High Plains into the Ohio Valley for a Slight Risk (level 2 out 5) of severe weather on June 19. Throughout the afternoon, numerous storms developed in the Central High Plains, particularly in eastern Colorado and the Nebraska Panhandle. These storms progressively organized into a mesoscale convective system (MCS) while surging east southeastward through regions of Colorado, Nebraska, and Kansas. Embedded bowing segments generated strong straight-line wind gusts topping 80 mph (120 kph).

Further east, severe storms evolved in regions of western Illinois and eastern Missouri including the St. Louis Metro. Robust storms, producing baseball size and larger hailstones, were ignited along a lake breeze and stationary front in southern Michigan.

June 20

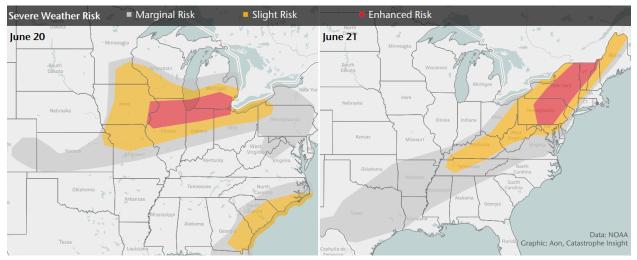


A remnant mesoscale convective vortex (MCV) which produced severe storms across the Plains on June 20, aided in the evolution of additional severe weather near and east of the southern tip of Lake Michigan in the late afternoon on June 20. Concurrently, and increasingly unstable environment across regions of the Great Lakes and Midwest was developing south of a northward lifting warm front and ahead of an approaching cold front and low-pressure system. The SPC highlighted a region spanning eastern lowa toward southern Michigan and northwest Ohio, including the Greater Chicagoland area, for an Enhanced Risk (level 3 out 5) for severe storms.

By the evening, multiple discrete storms and storm clusters evolved in the Middle Mississippi Valley and generated strong winds and large hail. As the storms

Data: Weather Prediction Center generated strong winds and large hail. As the storms propagated east southeastward, a particularly bad situation unfolded across northeastern Illinois into the overnight hours of June 20-21.

Storms in this region rapidly organized into a dangerous quasi-linear convective system (QLCS) which generated significant impacts - including damaging tornadoes, severe straight-line winds with gusts topping 60 mph (96 kph), and locally heavy rainfall. Multiple **Tornado Warnings** and **Severe Thunderstorm Warnings** were issued across portions of Chicago and the surrounding suburbs as the storms encroached upon the region. A **Particularly Dangerous Situation** (PDS) Tornado Warning was prompted as a **Tornado Debris Signature** (TDS) was evident on radar imagery in southern DuPage County (Illinois). The tornado resulted in extensive damage across densely populated regions including Naperville, Woodridge, and Darien. At the peak, debris from the storms were lofted 15,000 to 20,000 feet (4,570 to 6,100 meters) into the air. Storm surveys from the National Weather Service (NWS) concluded the tornado reached EF-3 intensity on the Enhanced Fujita Scale – with maximum wind speeds approaching 140 mph (225 kph). This ranked as the strongest tornado in the NWS Chicago forecast region since 2017, and the strongest tornado in DuPage County since 1976 – with reliable records extending back to 1950.



June 21-22

At the start of the period, the sweeping cold front which enhanced the previous days severe weather across the Midwest pushed eastward while draped from the Great Lakes southwestward into the Southern Plains. Moisture pooling along and ahead of the frontal boundary aided in initiating numerous rounds of showers and thunderstorms spanning from the Gulf Coast into the Northeast between June 21-22. On June 21, the SPC upgraded a corridor extending from central Pennsylvania into Vermont for an Enhanced Risk (level 3 out 5) for severe weather. Numerous severe storm clusters and linear segments developed across the region. The storms generated hundreds of reports of strong straight-line winds through the afternoon and evening hours. A majority of the reports occurred in the Central Appalachians, Mid-Atlantic, and interior Northeast.

North of the United States border, the same frontal boundary and moist air mass triggered severe and rotating storms in regions of southern Quebec, Canada. A deadly EF-2 tornado was spawned in the afternoon hours of June 21 in the densely populated suburb of Mascouche, north of Montreal.

Event Details

June 17-18

In **Wisconsin**, large hail (2.0-inch, 5.1-centimeters or greater) were reported in Buffalo, Pierce, and Trempealeau Counties on June 17. In Buffalo County, 2.5-inch (7.0-centimeter) hail fell near Cochrane. Strong winds in Trempealeau County resulted in numerous downed trees and limbs, several of which impacted houses. Instances of wind damage to crops were observed across the region.

In **Minnesota**, large hail were reported in Dakota, Goodhue, Le Sueur, Rice, Wabasha, and Winona Counties on June 17. Several instanced of hailstones larger than a baseball were observed in Goodhue County. Impacts to structures and vehicles were noted near Lonsdale (Rice County) and Cannon Falls (Goodhue County).

In **Indiana**, 2.0-inch (5.1-centimeter) and larger hail were reported in Hancock, Henry, Madison, Marion, and Putnam Counties on June 18. Localities in both Hancock and Putnam County observed hailstones reaching and exceeding 3.0 inches (7.6 centimeters), larger than a baseball. Northeast of Indianapolis, numerous instances of hail denting or damaging vehicles were reported.

Multiple bouts of locally heavy rainfall throughout the day on June 18 resulted in significant flooding and flash flooding throughout central and southern portions of the state. In Monroe County, a weather station near Ellettsville measured 7.42 inches (189 millimeters) of rainfall by the morning of June 19. In downtown Bloomington, multiple businesses were damaged by rising floodwaters, while local roadways were inundated several feet high. Emergency officials in Bloomington performed at least 17 water rescues during the event. A car swept away by rising floodwaters resulted in one fatality. In Owen County, an emergency declaration was enacted as flooding severely damaged county roads. A nearby weather station in Spencer measured 7.41 inches (188 millimeters) of rainfall during the event.

In **Ohio**, hailstones reaching 2.5 inches (7.0 centimeters) in diameter pelted localities near Beavercreek in Green County.



Tornado damage in Jay County, Indiana from June 18 Source: NWS DAT

Storms with supercell characterizes generated two EF-2 tornadoes near the Indiana and Ohio border in the late afternoon on June 18. In Indiana, an EF-2 tornado touched down southeast of Bryant in Jay County. The tornado peaked with maximum estimated wind speeds of 130 mph (210 kph) and a path length of approximately 5.2 miles (8.4 kilometers). The storm significantly damaged or destroyed several rural homes and farmsteads, while toppling a large communications tower.

Weekly Cat Report

A second EF-2 tornado spawned by the storms touched down several minutes later along the Indiana and Ohio border and tracked nearly 5.7 miles (9.2 kilometers) into Mercer County, Ohio. The tornado resulted in damage to multiple homes in addition to the Fort Recovery Lumber Yard. The most significant damage was incurred along Burrville Road and included removal of attached garages and roofs, projectiles embedded in exterior walls of structures, and toppled trees. Additional impacts to livestock and agriculture were noted.

In **Iowa**, storms which formed in southern portions of the state in the late evening generated several reports of extremely large hailstones on June 18. Hail reaching 3.0 inches (7.6 centimeters) and larger were reported in Adair, Marion, Monroe, Montgomery, Pottawattamie, Union, and Wayne Counties. Hailstones larger than a grapefruit, 5.0 inches (12.7 centimeters) pummeled regions of Montgomery County. In Marion County, officials reported damage to multiple outbuildings as well as downed utility lines.



In **Illinois**, an EF-1 tornado in Knox County resulted in notable impacts to farmland and vegetation, while several outbuildings were damaged or destroyed on June 18. South of the tornado track, a large swath of straight-line damage was surveyed and included impacts to crops, trees, and utility lines. A maximum wind gust of 90 mph (145 kph) was measured near Saint Augustine.

June 19

In **Colorado**, several land spouts were spotted in Adams County. An 82 mph (132 kph) wind gust was measured in Lincoln County near Limon, while a 75 mph (120 kph) gust was recorded in Yuma County.

In **Kansas**, strong winds resulted in localized damage throughout northwestern sections of the state. In Thomas County, multiple structures and outbuilding were impacted, including several grain bins which were collapsed during the severe weather. Downed power lines and utility poles impacted local transportation. A wind gust of 88 mph (142 kph) was measured in Thomas County, while a gust reaching 89 mph (143 kph) was reported in Sheridan County.

In **Michigan**, hailstones approaching 3.0 inches (7.6 centimeters) fell in Lenawee County, while 4.0-inch (10.2-centimeter) hail, larger than a softball, were observed in portions of Hillsdale County. Weekly Cat Report

June 20-21

In the wake of the Midwest severe weather on June 20-21, more than 200,000 customer power outages were reported across Illinois, Indiana, Michigan, Missouri and Ohio by the morning of June 21.

As of this writing, at least two tornadoes were confirmed to have touched down in northeast **Illinois** in the latenight hours of June 20. The most significant was an EF-3 tornado which generated extensive damage in densely populated suburbs southwest of Chicago. The tornado reached a peak intensity of 140 mph (225 kph), with a path length exceeding 16 miles (25.7 kilometers) which spanned portions of DuPage and Cook Counties. According to the National Weather Service (NWS), the storm resulted in at least 11 injuries and downed thousands of trees. Preliminary storm surveys indicated no less than 380 homes were impacted to varying degrees, of which 28 were destroyed, and 156 suffered



A destroyed home near Naperville, Illinois Source: NWS Chicago

major damages. The tornado first touched down south of downtown Naperville and proceeded to track eastward while causing sporadic damage. Peak intensity was obtained near Princeton Circle in Naperville where several homes were destroyed, and numerous others suffered major damages. Extensive damage was subsequently surveyed in Woodridge, where residences and structures lost walls, and roofs were torn from apartment buildings. Impacts and widespread tree damage continued through southern Darien and across Interstate-55 before the tornado finally dissipated in Cook County, near Buffalo Woods.

To the south, a swath of straight-line wind damage and a brief EF-0 tornado were surveyed between Plainfield and south Romeoville in Will County, which resulted in significant impacts to vegetation.

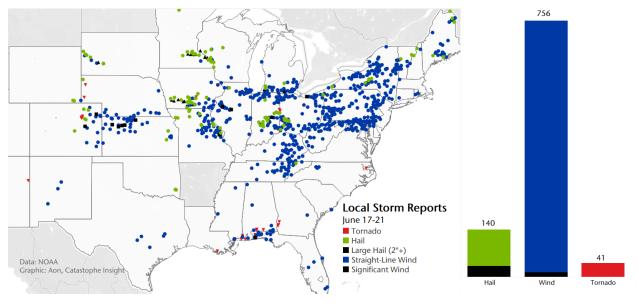


In **Indiana**, two brief EF-1 tornados were surveyed in St. Joseph and Steuben Counties, both with maximum wind speeds approaching 100 mph (160 kph). The tornadoes touched down in the overnight hours of June 21. In Steuben County, one of the tornadoes resulted in extensive damage to trees along with impacts to outbuildings near the Town of Fremont. In addition, strong winds tore roofing from several homes. Minor impacts to property and vegetation were also incurred in St. Joseph County. A weaker, EF-0 tornado, was also surveyed in Porter County.

In **Michigan**, hailstones reaching 2.0 inches (5.1 centimeters) were reported in Berrien County. In **Iowa**, hailstones reaching 2.0 inches (5.1 centimeters) were observed in Union County.

Across the border into **Canada**, an EF-2 tornado touched down in southern Quebec in the afternoon of June 21, near the densely populated Montreal suburb of Mascouche. The tornado obtained peak maximum wind speeds between 180 to 200 kph (112 to 124 mph). The storm resulted in at least one fatality. Local officials indicated no less than 60 homes were damaged to varying degrees. The Red Cross anticipated 50 to 100 people were displaced by the event.

On June 21, multiple clusters and lines of storms, with embedded severe cells, generated notable widespread straight-line wind impacts extending from the **Central Appalachians** into the **Mid-Atlantic** and exterior **Northeast**. Impacts primarily consisted of downed trees and limbs, minor property and structural damage, and power outages. As of this writing, there were 371 reports of severe straight-line winds across the continental United States on June 21.



Financial Loss

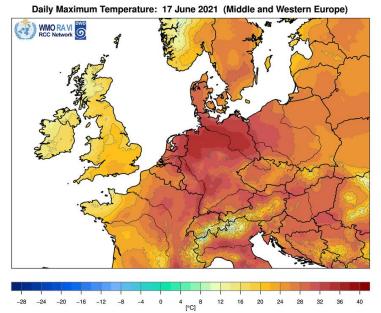
The widespread nature of severe weather and flooding during the past week from the Rockies into the Northeast resulted in notable damage. Tornado damage in portions of DuPage and Cook counties in northeast Illinois on June 20 alone was expected to result in damage reaching well into the millions of dollars (USD). It is expected that the combined total economic cost will reach into the hundreds of millions (USD), with most of the hail and wind related costs being covered by insurance.

Heatwave in Europe ends with a multi-day SCS outbreak

After the first significant heatwave developed across Europe through mid-June, a prolonged outbreak of severe convective storms caused considerable damage in Western and Central Europe. Severe weather wreaked havoc in parts of France, Belgium, the Netherlands, Switzerland, Germany, the Czech Republic, and elsewhere. The deadliest event occurred on June 24, as a destructive tornado severely impacted four municipalities in Southern Moravia, the Czech Republic and claimed four lives. Damage assessment were still in progress, but preliminary estimates suggest that total losses throughout Europe will reach into the hundreds of millions EUR.

Meteorological Recap

June 16-18



Location	Temperature (°C)	Date
Henningsdorf, Germany	36.9	June 19
Brumath, France	35.0	June 18
Pilsen, Czech Republic	35.7	June 18
Ell, Netherlands	33.1	June 18

After relatively cool and wet months of April and May, Europe experienced its first notable heatwave in mid-June. The situation resulted from a presence of strong anticyclone, which allowed for a strong omega-blocking pattern to develop. The warm period reached a particularly severe intensity in Germany, as temperatures peaked at 36.9°C (98.4°F). The heatwave had a relatively short duration and was followed by several days of increased thunderstorm activity, with notable impacts across multiple countries of Western and Central Europe.

Storms started to develop across southwestern Europe (Spain and France) on June 16-17, as a deep long-wave trough approached the continent and the omega-blocking pattern destabilized. Strong south to southwesterly winds aloft developed and thunderstorm activity ensued in a warm, unstable air mass ahead of the approaching cold front.

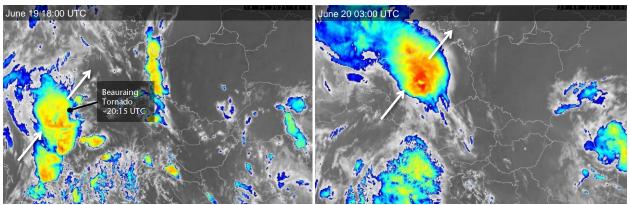
During the following days (June 19-22), the extensive blocking pattern, generated by a strong anticyclone, remained in place roughly over the eastern half of the continent and centered over the central part of European Russia. At the same time, a large trough persisted over Western Europe, with several frontal systems affecting the region – lows Thananont, Ulfert, Volker and finally Wolfgang (as named by the FU Berlin). This overall divergence allowed for a significantly unstable air mass to be directed into western and central parts of Europe and provided an important element of storm development.

June 19

On Saturday, **France** saw a culmination of the storm activity. In total, 51 departments (out of 96) were placed under orange (medium) severe thunderstorm warnings. Météo-France noted nearly 44,000 lightning strikes, the highest one-day total since July 27, 2013. Storm impacts were widespread and caused by all sub perils.

A destructive tornado occurred in Saint-Nicolas-de-Bourgueil, while further field assessments were launched in Aisne and Marne, as suspected tornadoes generated estimated gusts of up to 180 kph (112 mph). Several locations experienced extremely intense rain, including Changis, Seine-et-Marne with 46 millimeters (1.8 inches) within one hour. Storm reports also included very large hail, with the largest diameters of at least 10 centimeters (3.9 inches) recorded near Vercel in Doubs.

Notably, a mesoscale convective system (MCS) formed during the night to Sunday and affected parts of Belgium, the Netherlands and Western and Northern Germany. A destructive tornado occurred in Beauraing, **Belgium**, while the rest of the country experienced heavy rain and strong winds. The system tracked through Western **Germany** and affected parts of Rheinland-Pfalz, Nordrhein-Westfalen and Niedersachsen. Deutscher Wetterdienst reported significant rainfall accumulations; for example, 65 millimeters (2.6 inches) within a 12-hour period in Wipperfürth-Gardeweg, NRW; more than a half of this amount fell within one hour. Winds peaked at Hahn (RP) with 111 kph (69 mph).



Mesoscale Convective System in Western Europe on a false-color satellite image Source: $\check{C}HM\check{U}$

June 20

On Sunday, June 20, focus of the thunderstorm activity extended across parts of southeastern France, Switzerland, northern Italy, and southern Germany; it expanded further northwards toward the Baltic coast during the night to Monday. Storm impacts in France were generally minor, most of the reports came from departments of Isère, Savoie and Haute-Savoie. Isolated locations reported hailstones with diameters of up to 6 centimeters (2.4 inches). Storms in Switzerland mainly affected the French-speaking cantons and parts of canton Bern.

June 21-23

Renewed thunderstorm activity ensued during the first days of the current week, with most severe impacts north of the Alpine range in parts of Switzerland, Germany and the Czech Republic due to east-to northeast-moving storms. The worst impacts in **Switzerland** occurred on June 21. This was a result of mainly two storm systems; one that affected the northwest, including the area of La Chaux-de-Fonds, and another that mainly affected cantons Luzern and Zug.

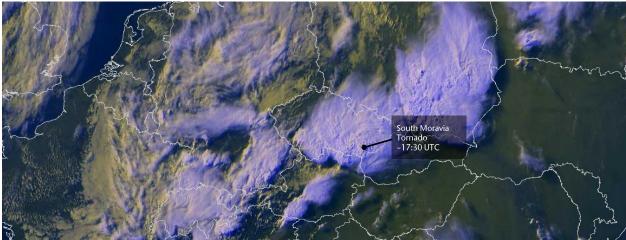
Southern **Germany** (federal states of Baden-Württemberg and Bayern) experienced several notable hailstorms, among which the most damaging occurred in the evening of June 21 and hit a wide swath including the town of Wolfratshausen, south of Munich with very large hail - with maximum diameter reported at 6.5 centimeters (2.6 inches).

The storm system would later track into Oberösterreich in **Austria** and resulted in agricualtural losses. On the follwoing day (June 22), a similar hail swath occured in Bayern to the north of the June 21 haisltorm, affecting the southern outskirts of Munich. At the same time, recorded hailstones were much smaller and the resulting damage was not expected to be as significant.

Storms which affected southern Germany would also track into parts of the **Czech Republic** during the night of June 22 and 24, causing further additional wind- and rainfall- realted impacts. Noteworthy thunderstorms also occurred in **Poland** on June 22. A notable rainfall event and resulting urban flooding was observed in Poznan.

June 24

Severe storm activity resulted in further impacts in Central Europe in the evening hours of June 24. The most notable event was a thunderstorm cluster that affected northeastern **Austria** with very large hail (maximum diameters of up to 6.5 centimeters or 2.6 inches) and would later spawn the most destructive tornado recorded in the **Czech Republic** in modern history. The twister, preliminarily rated EF3, affected the area between Břeclav and Hodonín. The wider area also recorded very large hail.



Supercellar storm system on a satellite image – June 24 17:00 UTC Source: ČHMÚ

Event Details

France & Spain

Widespread storm impacts across France resulted from a combination of heavy rain, large hail and strong winds, including isolated tornadoes. Storm reports largely came during the early stages of the outbreak on June 17-19, as the anticyclonic pattern deteriorated, and the low-pressure trough started to prevail in Western Europe. On June 17, wind-related damage was concentrated near **Toulouse** and in the Occitanie region, as gusts exceeding 100 kph (62 mph) caused multiple fallen trees and subsequent infrastructural damage which resulted in no less than 37,000 power outages. Flood-related impacts were reported near **Bordeaux** in Gironde department, where fire brigades intervened more than



Tornado damage in Saint-Nicolas-de-Bourgueil Source: Indre-et-Loire Fire and Rescue

500 times. Additionally, a small tornado damaged 25 homes in Montpon-Ménestérol in Dordogne.

The height of the storm activity occurred on June 19 in multiple regions; perhaps the most notable impact occurred in **Saint-Nicolas-de-Bourgueil** in Indre-et-Loire department, as a tornado destroyed the roof of a local church and damaged dozens of residential structures.

Strong impacts were additionally reported from **Spain**'s Extremadura region, where losses on cherry production were estimated at EUR30 million (USD36 million).

Belgium

The first storm impacts in Belgium, mainly rainfall-related, were reported from Walloon Brabant and Namur on June 18. The country was later impacted by the developing MCS which would affect western Germany during the night from June 19 to 20; the most notable impact occurred in the **Beauraing** municipality, as a destructive tornado left a trail of damage to 92 residential structures, of which 10 were left uninhabitable. The roof of a local sports hall was destroyed as well. Dozens of vehicles were damaged, and 17 people were injured. Additional, mainly wind-related effects were reported from elsewhere in the country, including Rochefort, Péruwelz, Leuze-en-Hainaut and Lessines.

Netherlands

Impacts in the Netherlands were largely concentrated in the evening of June 18 and were caused by a variety of subperils, yet the most significant effects were felt across the country due to strong non-tornadic winds. The Royal Dutch Meteorological Institute (KNMI) issued Code Orange for all provinces with the exception of southern regions of Zeeland, Noord Brabant and Limburg (Code Yellow).

The most noteworthy property damage occurred in a town of **Leersum** in Utrecht Province, with nine injuries, multiple broken trees and seven gas leaks. Approximately 10 to 20 homes were rendered uninhabitable. KNMI confirmed that the event was caused by a downburst phenomenon and the impacts were localized in the municipality.

Elsewhere in the country, at least six people were injured. Several provinces reported wind-related roof or motor damage and additional impacts due to large hail and heavy rain. Notably, a crane collapsed in Tiel, Gelderland and several high-voltage pylons were damaged in the country, causing power outages. Additionally, some losses were expected in agriculture; Dutch Fruit Growers Organization (NFO) expected several millions EUR in losses due to hail in Gelderland. In total, Dutch insurers were expected to receive thousands of weather-related claims.

Switzerland

Widespread hail damage was reported from Switzerland as a result of storm activity on June 18-21. National insurers registered some 35,000 claims, with the expected losses reaching above CHF100 million (USD109 million). A significant part of insured losses came from the agricultural sector; Schweizer Hagel, a national agricultural insurance entity, expected to receive 2,500 claims due to damage on crops, mainly in Vaud, Fribourg, Neuchâtel, Jura, as well as Bern, Luzern, Zug and Zürich. Noteworthy individual storms occurred on June 21: a storm with large hail and heavy rain affected cantons Zurich and Zug in the evening hours, while an afternoon storm resulted in a particular concentration of hail-related damage with thousands of filed claims near **La Chaux-de-Fonds** in Neuchâtel.

Germany

Widespread impacts from a complex combination of strong winds, large hail and heavy rainfall instances was observed in Germany throughout the outbreak, with several distinct damaging episodes. Among the most notable ones was a hailstorm that affected the swath south of Munich on June 21, including the Wolfratshausen area. Aggregated financial impact from the event will be determined in the coming weeks.

Austria

The Austrian agricultural insurance entity (OHV) noted the single most damaging event recorded so far as strong thunderstorms entered Oberösterreich on June 21-22, causing widespread hail-related damage. Particularly affected were districts of Vöcklabruck, Gmunden, Kirchdorf, Steyr-Land, Braunau, Ried and Schärding. Total affected area was estimated at 40,000 hectares (99,000 acres) and losses were expected to reach EUR22 million (USD26 million). Thousands of claims were also filed in Oberösterreich as a result of damage on vehicles and property, losses were expected to run into the tens of millions EUR. Additional storm-related impacts were reported from across the country, notably Salzburg and Tirol states.

Additional impacts were registered in the afternoon of June 24, as strong thunderstorms affected parts of Niederösterreich. As many as 1,600 fire and rescue personnel conducted emergency operations as several hundreds of roofs were damaged or destroyed by large hail. Among the worst affected were districts Hollabrunn, Mistelbach, Gmünd, Horn, Zwettl and Waidhofen a. d. Thaya.

Poland

Notable impacts were also registered in Poland from June 21 through 24. Height of the activity occurred on June 22 with several noteworthy concentrations of damage; including urban flooding in Poznan. nationwide, fire and rescue services intervened more than 2,600 times. Additional impacts occurred on June 24; notably, an EF2-rated tornado damaged or destroyed roughly 30 roofs on residential structures and 30 other buildings in Nowy Sacz powiat (municipality).

Czech Republic

Storm impacts in the Czech Republic on June 21-23 were relatively minor, yet national insurers initially reported roughly 1,000 filed claims (as of June 23), mostly related to hail damage and flooded basements. Largest concentration of damage occurred in the afternoon of June 21 in south Moravia, and during the night to June 22 in the southwestern Bohemia, as storms progressed from Bavaria. Additional strong thunderstorms affected South and Central Bohemian region during the night to June 24 and resulted in more than 45,000 power outages; total financial impact was thus expected to increase.

The most significant event occurred in the evening of June 24, when a **destructive tornado**, preliminarily rated EF3, severely impacted four municipalities in Southern Moravia (Hrušky, Moravská Nová Ves, Mikulčice and Lužice) and parts of the town of Hodonín.



The tornado resulted in a severe structural damage to hundreds of residential structures in the affected municipalities. It was too early to determine an exact number at the time of this writing, as rescue operations still continued. In Lužice, up to 120 homes were severely damaged, some of which will need to be demolished. Authorities in Hrušky (population of ~1,500) estimated that the event "destroyed one third of the municipality", with entire streets having sustained irreparable damage. During the night to June 25, large-scale rescue operation aimed to rescue local residents potentially trapped in rubble. More than 100 fire and rescue units from across the country conducted the operation, with a help of several units from neighboring Slovakia and Austria. As of the morning of June 24, authorities confirmed four fatalities and roughly 150 to 200 injuries.

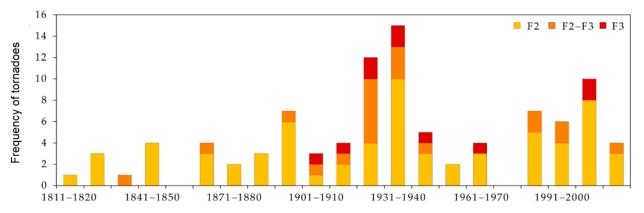
Northern outskirts of Hodonín were also affected; notably, a senior care home was severely damaged, parts of a local zoo also sustained significant damage. Widespread disruption in traffic and energy supply occurred in the wider region; including at least 14 railway lines and a major highway connecting the Czech Republic and Slovakia. There were more than 121,000 power outages at the height of the storm.



Tornado damage in South Moravia Source: South Moravia region Fire and Rescue

Significance of the Moravia tornado

The tornado that impacted South Moravia in the Czech Republic on June 24 is the most destructive and deadliest in country's modern history. At the same time, tornadoes are a rare, but not an exceptional phenomenon for the country. Over the past 200 years, 10 extreme tornadoes of F3 intensity have been reported; with the most active period during the first half of the 20th century.



Decadal frequencies of F2+ tornadoes classified by intensity in the Czech Republic, period 1811-2019 Source: Brázdil, et al. 2020: The Climatology of Significant Tornadoes in the Czech Republic

With the current official number of fatalities (4), the event is also the deadliest tornado outbreak in Europe since 2008.

Financial Loss

Impacts of the prolonged outbreak of convective weather were widespread in multiple European countries and included effects of a variety of subperils, including tornadoes, strong non-tornadic winds, large hail or heavy rain. Aggregated financial impact from the events is likely to be significant from the European perspective. Insurance entities across the continent were in process of determining the amount of losses, which will likely reach at least into several hundreds of millions EUR. In Switzerland alone, tens of thousands of claims with total losses exceeding CHF100 million (USD109 million). Notable impacts were expected in France, Belgium, the Netherlands, Germany and elsewhere.

Weekly Cat Report

Tropical Storm Claudette brings notable Gulf Coast impact

Tropical Storm Claudette became the third named storm of the 2021 Atlantic Hurricane Season. Claudette was officially recognized as a Tropical Storm on June 19 after its center of circulation was already over land in southeastern Louisiana. Despite being a low-end tropical storm, Claudette generated moderate coastal inundation, torrential rainfall, and localized severe weather across the Gulf Coast and Southeastern United States between June 18-21. Coastal regions of Louisiana, Mississippi, Alabama, and the Florida Panhandle were most affected. At least 14 fatalities in Alabama have been linked to storm related impacts. Total economic losses were anticipated to reach into the millions (USD).

Meteorological Recap



Satellite image of TS Claudette on June 19, 13:00 UTC Source: CIRA/RAMMB

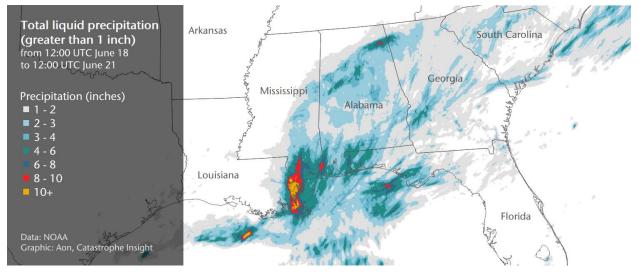
The National Hurricane Center (NHC) began monitoring a deepening trough of low pressure in the Bay of Campeche on June 11-12 for potential tropical development. In subsequent days, the nearly stationary disturbance generated heavy rainfall across portions of Central American and southern Mexico. The disorganized area of cloudiness and showers began to move northward into the west-central Gulf of Mexico by June 17. During this time, satellite imagery showed gradual intensification which included a curved band of deep convection prompting the NHC to classify the disturbance as Potential Tropical Cyclone Three at 4:00 PM CDT (21:00 UTC) on June 17. The potential tropical

cyclone designation is used to categorize tropical disturbances which have not yet reached tropical cyclone status but are expected to bring tropical storm-force or higher conditions to coastal and/or inland locations.

Lacking a well-defined center, the system continued north northeastward toward the U.S. Central Gulf Coast on June 18. Further intensification of the potential tropical cyclone was limited due to its broad and asymmetric structure, hostile southwesterly wind shear, and limited time over warm waters in the Gulf of Mexico. Prior to interaction with land, Tropical Storm Warnings were in effect for east of Morgan City in Louisiana to the Okaloosa and Walton County line in Florida, and included Lake Pontchartrain, Lake Maurepas, and Metropolitan New Orleans. By this time, heavy and incessant rainfall associated with the tropical system began enhancing concerns of flooding along the already saturated soils of the central Gulf Coast states.

Tropical Storm Claudette was officially recognized at 4:00 AM CDT (9:00 UTC) on June 19 after the now well enough defined center of circulation was already inland over southeastern Louisiana. Tropical Storm Claudette had an initial intensity of 45 mph (75 kph) and was tracking north-northeast at 12 mph (19 kph). Claudette became the 3rd named storm of the 2021 Atlantic Hurricane Season – and the fifthearliest 3rd Atlantic named storm since 1950.

Impacts from Claudette extended well east of the storm's center, and included significant flooding and flash flooding, moderate coastal inundations, damaging tornadoes, and locally severe straight-line winds – particularly across regions of southeast Louisiana, Alabama, and the Florida Panhandle. A maximum storm surge of 5.49 feet (1.67 meters) above mean higher high water was reached at Waveland, Mississippi on June 19. As the storm continued to track inland, Claudette was downgraded to a tropical depression at 4:00 PM CDT (21:00 UTC) on June 19 while over southwestern Alabama. Claudette pulled abundant amounts of moisture from the Gulf of Mexico inland, allowing storm total rainfall amounts to approach and exceed 8 to 10 inches (200 to 250 millimeters) across portions of southern Louisiana and Mississippi. A weather station east of the Pearl River in Hancock County, Mississippi recorded a storm total precipitation of 12.26 inches (311 millimeters).



Claudette accelerated north northeastward across the Southeast on June 20, ahead of an upper level trough digging across the central United States. Surface data and satellite imagery confirmed Claudette re-intensified into a tropical storm while located over eastern North Carolina at 5:00 AM EDT (9:00 UTC) on June 21 with maximum wind speeds reaching 40 mph (65 kph) – prompting additional Tropical Storm Warnings for regions of coastal North Carolina. The circulation of Claudette emerged over the Atlantic in the early afternoon on June 21. At 11:00 PM AST on June 21 (3:00 UTC on June 22) the NHC indicated Claudette had devolved into a low-pressure trough 160 miles (260 kilometers) south-southeast of Nantucket, Massachusetts.



Flooding in St. Tammany Parish, Louisiana Source: St. Tammany Fire Protection District #1

Event Details

In **Louisiana**, regions east of Lake Pontchartrain, particularly the town of Slidell in St. Tammany Parish were among the hardest hit. Maximum local rainfall totals in these locations topped 10 inches (250 millimeters). Floodwaters in Slidell inundated local roadways, damaging numerous vehicles and several buildings. The Slidell Police Department reported 40 to 50 flooded vehicles had to be removed from local streets.

Weekly Cat Report

In **Mississippi**, flooded occurred in the coastal counties, and was most severe in portions of Jackson and Hancock Counties. In Hancock County, flooded streets in Shoreline Park trapped residents in their homes. Rising waters damaged several structures during the event. Emergency management officials assisted with at least 17 water rescues in Hancock County alone. In Harrison County, two brief tornadoes generated minor property damaged near Long Beach and Pass Christian.



Tornado Damage in East Brewton, Alabama Source: NWS-Mobile (DAT)

In **Alabama**, at least fourteen weather related fatalities were confirmed across the state. A multi-vehicle collision on Interstate-65 in Butler County was caused by vehicles which hydroplaned on wet roadways related to rainfall from Tropical Storm Claudette. As of this writing, ten deaths related to the incident have been confirmed. Elsewhere, two deaths near Tuscaloosa were caused by a tree which fell on a home, and two additional deaths throughout the state were flooding related.

In Escambia County, a damaging EF-2 tornado touched down near East Brewton during the afternoon of June 19 and remained on the ground for approximately 22 miles

(35 kilometers) tracking into Conecuh County. The tornado obtained maximum wind speeds of 127 mph (204 kph) and resulted in at least 20 injuries. Preliminary estimates indicated the twister damaged or destroyed no less than 50 homes. Among the worst damage was incurred to trees, business, structures, and a mobile home park near East Brewton.

In **Florida**, Pensacola Regional Airport reported a wind gust of 81 mph (130 kph) as a line of storms associated with Claudette impacted the region during the morning of June 19, while a 71 mph (114 kph) wind gust was recorded further east near Santa Rosa Sound. In both Escambia and Santa Rosa Counties, the strong winds toppled utility poles and trees, several of which damaged residences and businesses. At least 10,000 customers in these counties lost power during the storms.

In **Georgia**, and EF-1 tornado tracked across rural regions of Early and Randolph Counties. The tornado resulted in minor structural damage to homes while snapping numerous trees – several of which blocked roadways.

Financial Loss

The total financial toll from Claudette's impacts across the Gulf Coast and Southeast– including locally heavy rainfall and severe weather in flood prone regions of Louisiana, Mississippi, Alabama, and Florida – was expected to reach into the tens of millions (USD). Given relatively low National Flood Insurance Program (NFIP) take-up in the region inland from the coast, most flood damage to properties was likely to be uninsured. The low-pressure system which eventually developed into Tropical Storm Claudette produced several days of storms and flooding rains across portions of central America and southern Mexico, resulting in localized damage.

Natural Catastrophes: In Brief

Tropical Storm Dolores (Mexico)

Tropical Storm Dolores developed out of an elongated area of low pressure which originated off the coast of southwestern Mexico in mid-June. The National Hurricane Center (NHC) indicated Dolores first reached tropical storm status on June 18 at 10:00 AM CDT (15:00 UTC), before later making landfall on June 19 in Mexico near the Michoacán and Colima border as a high-end tropical storm with maximum wind speeds reaching 70 mph (110 kph). The states of Oaxaca, Guerrero, Michoacán, Colima, and Jalisco incurred the greatest impacts. Three deaths were confirmed in Oaxaca (2) and Jalisco (1) due to lightning strikes. A three-day rainfall total of 440 millimeters (17.3 inches) was measured in Callejones, Colima by the morning of June 20. More than 9,000 hectares (22,240 acres) of banana crops were affected in the state of Colima alone. At least 54,000 customers were left without electricity, along with hundreds of toppled trees and damaged homes.

Flooding (India)

Since the monsoon officially arrived on June 3, heavy seasonal rains coupled with thunderstorms, and lightning continued across India, resulting in casualties and material damage. Among the hardest-hit states included Uttar Pradesh, Maharashtra, Karnataka, Kerala, and Gujarat. At least 8 river locations swelled to above the flood warning level, causing notable inundation damage. Government reports cited at least 22 fatalities and dozens of others injured from June 17-23. As many as 1,325 combined homes along with numerous public and private infrastructure were either damaged or destroyed, and vast areas of cropland was inundated. Total economic losses were likely to run well into the millions (USD).

Severe Weather (New Zealand)

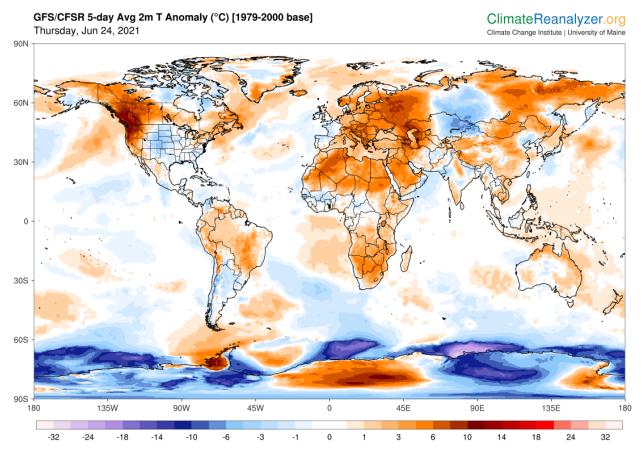
Severe weather initiated across northern parts of New Zealand on June 19, leading to notable impacts in the greater Auckland metropolitan region. The most significant hazards associated with the event included damaging winds, extreme precipitation, and an isolated tornado which ripped through the South Auckland suburb of Papatoetoe. According to the local media, at least 250 houses along with several other structures were damaged to varying degrees. One person was killed, and dozens of homes were rendered inhabitable. The Insurance Council of New Zealand cited that more than 300 insurance claims, mostly related to home insurance policies, had been filed as of June 21.

Flooding (Ukraine)

One person was killed, 54 were injured, and more than 1,300 evacuated as a result of flooding, which affected parts of the Crimea peninsula in the night from June 17 to 18 after a particularly intense rainfall episode caused by an extratropical cyclone over the Black Sea. Among the worst affected were Yalta and Kerch cities. Crimean authorities estimated that restoration costs of damaged roads and other infrastructure will reach RUB5.5 billion (USD76 million). Approximately 75 percent of this amount was required in Yalta, the rest in Kerch and Kirovsky, Leninsky, and Feodosia districts.

Flooding (China)

Seasonal precipitation triggered severe flash flooding in the northeastern parts of China last week, with the greatest impacts seen in Inner Mongolia and Heilongjiang. According to the Chinese Ministry of Water Resources, major rivers in the affected region swelled to above the flood-warning level at several locations, resulting in inundation of private and public infrastructure along their banks. Some of these rivers peaked at historic levels. Thousands of homes, businesses, railway tracks, road sections, and bridges were damaged to various degrees and a vast area of cropland was left inundated. The total economic losses were anticipated to be in the tens of millions (USD).



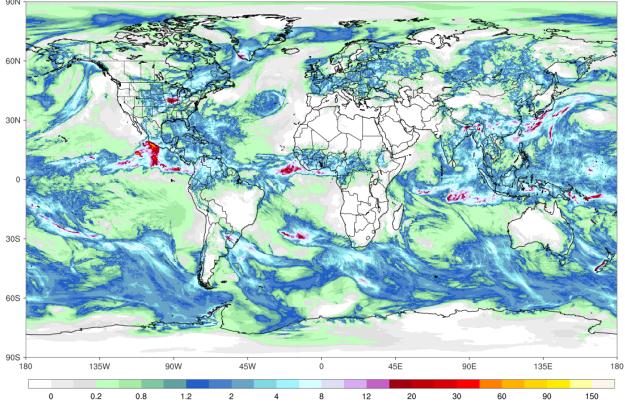
Global Temperature Anomaly Forecast

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

Global Precipitation Forecast

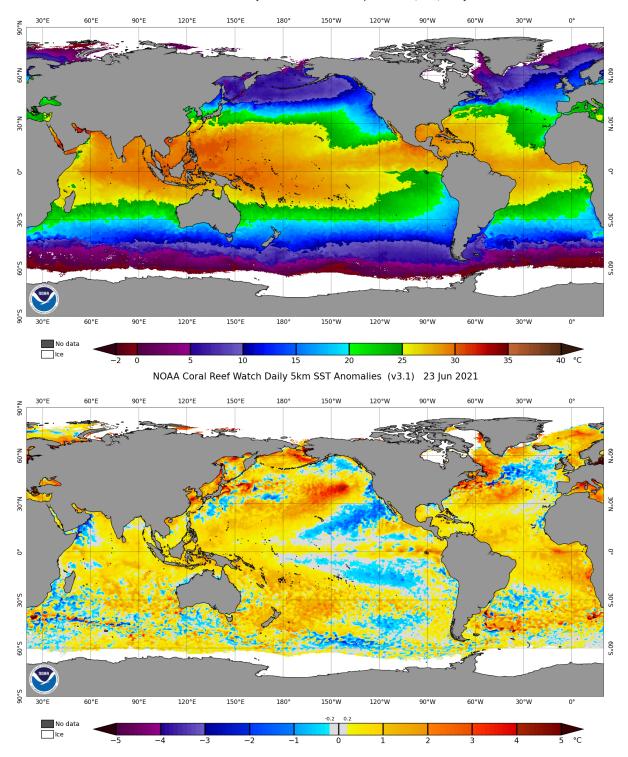
GFS 5-day Total Accumulated Precipitation (cm) Thursday, Jun 24, 2021





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

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

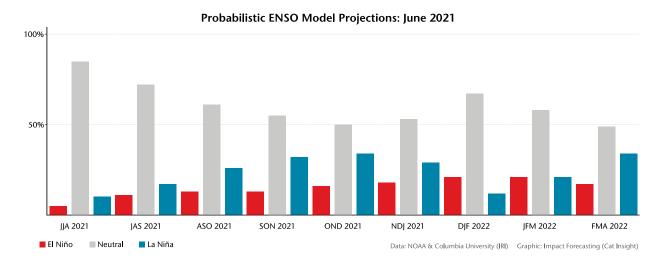


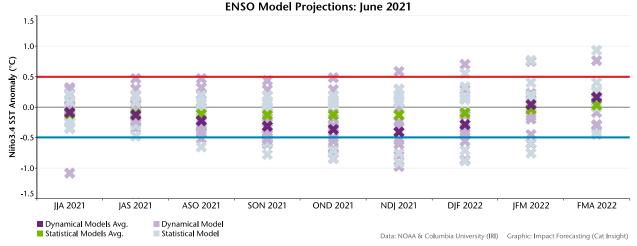
NOAA Coral Reef Watch Daily 5km Sea Surface Temperatures (v3.1) 23 Jun 2021

Weekly Cat Report

El Niño-Southern Oscillation (ENSO)

ENSO-neutral conditions are currently present. NOAA notes a 78 percent chance that these neutral conditions will persist through the Northern Hemisphere summer (June-August), and a 50 percent chance of ENSO neutral lasting into boreal fall (September-November).





El Niño refers to the above-average sea-surface temperatures (+0.5°C) that periodically develop across the east-central equatorial Pacific. It represents the warm phase of the ENSO cycle.

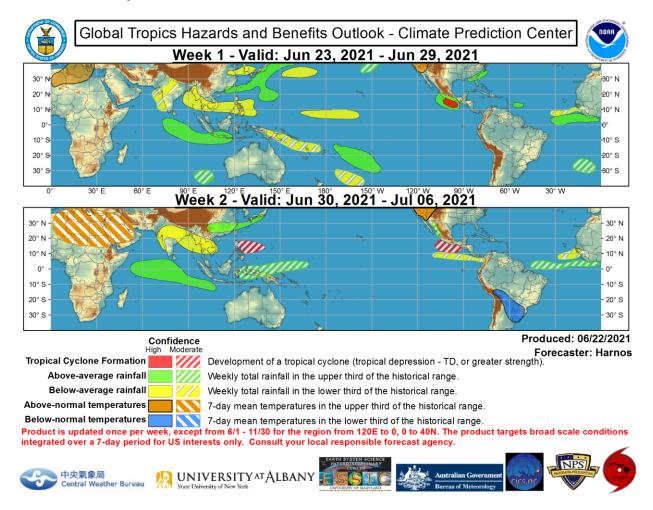
La Niña refers to the periodic cooling of sea-surface temperatures (-0.5°C) across the east-central equatorial Pacific. It represents the cold phase of the ENSO cycle.

El Niño and La Niña episodes typically last nine to 12 months, but some prolonged events may last for years. While their frequency can be quite irregular, El Niño and La Niña events occur on average every two to seven years. Typically, El Niño occurs more frequently than La Niña.

ENSO-neutral refers to those periods when neither El Niño nor La Niña conditions are present. These periods often coincide with the transition between El Niño and La Niña events. During ENSO-neutral periods the ocean temperatures, tropical rainfall patterns, and atmospheric winds over the equatorial Pacific Ocean are near the long-term average.

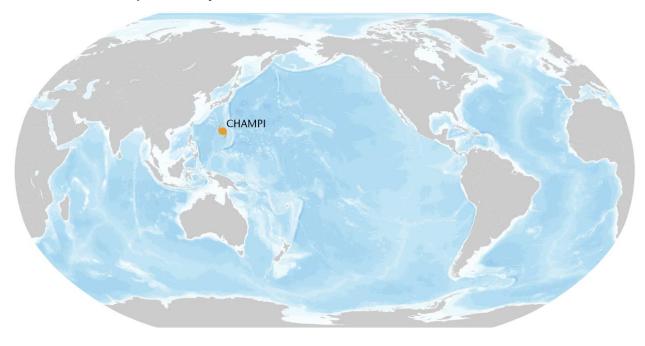
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

Global Tropics Outlook



Source: Climate Prediction Center

Current Tropical Systems



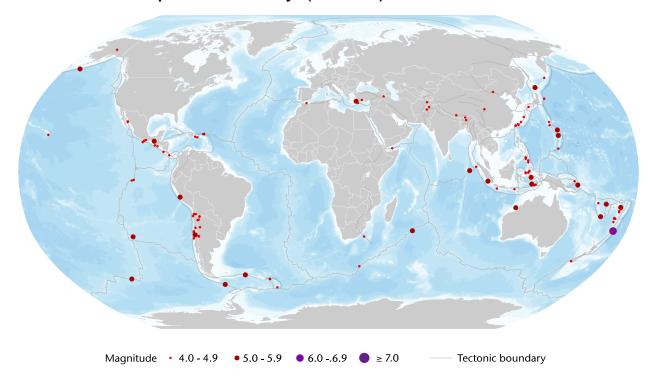
🖕 Tropical Depression 🖕 Tropical Storm 🖕 Category 1 🖕 Category 2 🖕 Category 3 🖕 Category 4 🖕 Category 5

Location and Intensity Information

Name*	Location	Winds	Storm Reference from Land	Motion**
TY Champi	20.3°N, 139.6°E	65 mph	250 miles (400 kilometers) SSW from Iwo Jima, Japan	N at 7 mph

* TD = Tropical Depression, TS = Tropical Storm, HU = Hurricane, TY = Typhoon, STY = Super Typhoon, CY = Cyclone ** N = North, S = South, E = East, W = West, NW = Northwest, NE = Northeast, SE = Southeast, SW = Southwest

Sources: National Hurricane Center, Joint Typhoon Warning Center, Central Pacific Hurricane Center



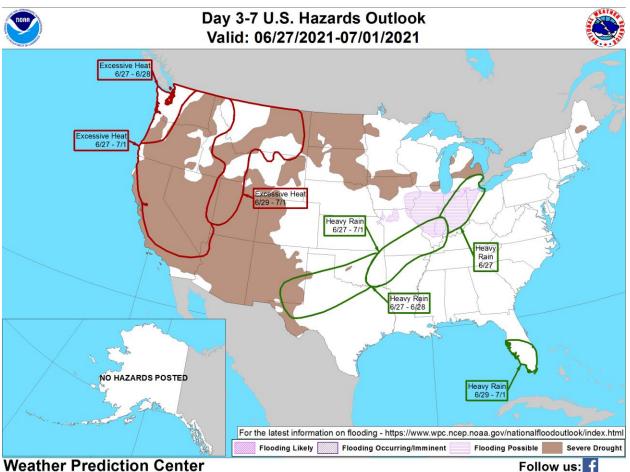
Global Earthquake Activity (≥M4.0): Jun 18 – 24

Significant EQ Location and Magnitude (≥M6.0) Information

Date (UTC)	Location	Magnitude	Depth	Epicenter
06/20/2021	30.21°S, 177.81°W	6.5	10 km	Kermadec Islands, New Zealand

Source: United States Geological Survey

U.S. Weather Threat Outlook



Made: 06/24/2021 3PM EDT

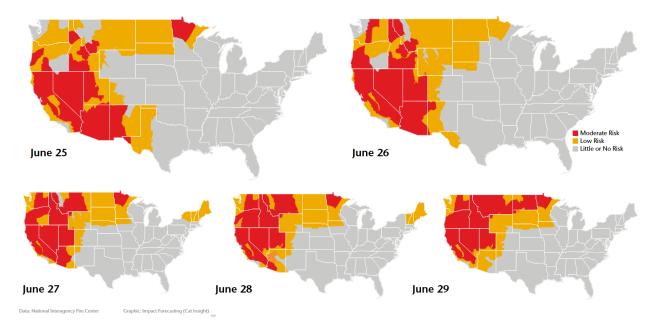
www.wpc.ncep.noaa.gov

Potential Threats

- An expansive and anomalous upper level high is expected to bring multiple days of record-breaking and excessive heat to the Pacific Northwest, Intermountain West, Great Basin, and California by the start of the medium range period on June 27. Excessive heat will subsequently expand into the Northern Rockies and Northern Plains and persist through July 1.
- Abundant moisture associated with an upper level trough and a series of frontal systems is anticipated to bring heavy rainfall to a large portion of the central U.S. by June 27. Heavy rains will continue in regions of the Southern Plains and Lower/Middle Mississippi Valley through July 1.
- Heavy rainfall associated with tropical moisture is likely to impact the southern Florida peninsula between June 29 and July 1.

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

The National Interagency Fire Center has highlighted large expanses of the country facing potential fire risk during the next week, particularly across drought-stricken regions of the Southwest and north-central U.S. A prolonged period of excessive heat and dry conditions is anticipated across much of the West next week, including the Pacific Northwest. Above average temperatures in California and the Intermountain West will also lead to enhanced wildfire.



Annual YTD Wildfire Comparison: June 24*

	Year Number of Fires	Acres Burned	Acres Burned Per Fire
2017	28,331	2,638,575	93.13
2018	27,822	2,230,292	80.16
2019	18,205	579,901	31.85
2020	23,052	1,079,167	46.81
2021	29,564	1,192,236	40.33
10-Year Average (2011-2020)	25,421	1,702,360	66.97

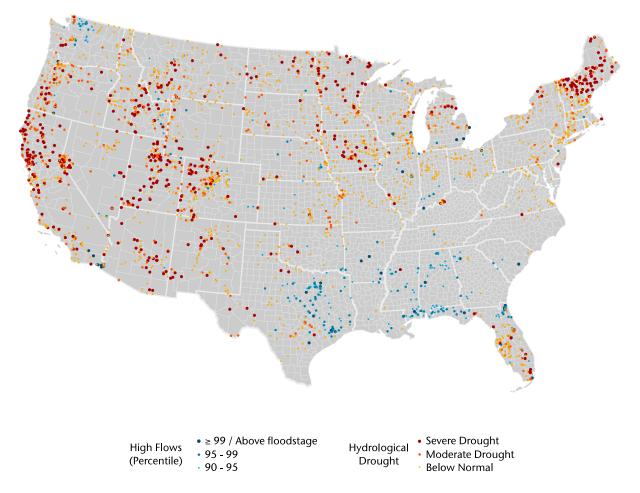
Source: National Interagency Fire Center

Top 5 Most Acres Burned by State: June 24

	State	Number of Fires	Acres Burned	Acres Burned Per Fire
Arizona		1,013	310,485	306.50
New Mexico		382	119,314	312.34
Oklahoma		1,011	83,931	83.02
Florida		1,624	75,271	46.35
Texas		2,277	65,394	28.72

Source: National Interagency Fire Center

Current U.S. Streamflow Status



 $A \ge 99^{th}$ 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 steam in a state of severe drought has 7-day average streamflow of less than or equal to the 5th percentile for this day of the year. Moderate drought indicates that estimated 7-day streamflow is between the 6th and 9th percentile for this day of the year and 'below normal' state is between 10th and 24th percentile.

Top 5 Rivers Currently Nearing or Exceeding Flood Stage

Location	Current Stage (ft)	Flood Percentile
Big Black River near Bovina, Mississippi	32.08	98.82
Ecofina Creek near Bennett Florida	8.64	98.77
North Fork Black Creek near Middleburg, Florida	7.61	98.70
Cedar River near Cedar Falls, Washington	5.08	98.67
Crane Creek near Weiser, Idaho	2.90	98.65

Source: United States Geological Survey

Source Information

Active week of severe weather impacts much of the U.S. U.S. National Weather Service U.S. Storm Prediction Center Destructive tornado strikes western Chicago suburbs, injuring 5, The Washington Post Large hail damages vehicles across central Indiana, WTHR Tornado Damages Homes Near Indiana/Ohio State Line, The Weather Channel Downtown Bloomington businesses, area residents deal with flooding damage, The Herald-Times Powerful winds leave damage in parts of NW Kansas, KWCH 12 Deadly EF2 tornado confirmed from Monday's dangerous storms in Quebec, The Weather Network Tornado Tears Through Chicago Suburbs, Causing Damage and Injuries, The Weather Channel Overnight tornado — with winds over 135 mph — roars through Naperville, Woodridge, Darien, The Chicago Tribune Woodridge Tornado Damaged Nearly 400 Homes, With More Than 2 Dozen a 'Complete Loss', NBC Chicago Heatwave in Europe ends with a major SCS outbreak

Thunderstorms and floods: 500 interventions in Gironde, houses affected in Dordogne, the point in the South-West. Sud Ouest Strong thunderstorms in the Toulouse region, an injured child and many falling trees. France Bleu Severe weather rages over the Netherlands: electricity pylons and crane overturned. De Telegraaf Bad weather: hail caused more than 100 million damage. La Cote After storms, insurance companies record damages worth tens of millions of CZK. ČTK Schweizer Hagel European Severe Weather Database Deutscher Wetterdienst

Tropical Storm Claudette brings notable Gulf Coast impact

U.S. National Hurricane Center U.S. National Weather Service

U.S. Storm Prediction Center

Tropical Storm Claudette Now Over the Atlantic After Soaking the Southeast, The Weather Channel Tropical Storm Claudette forms over southeast Louisiana, Yale Climate Connections Tropical Storm Claudette hits Louisiana, will spread flooding rain over Southeast, The Washington Post 'Really, really scary': Tropical Storm Claudette punch caused unexpected damage, Pensacola News Journal

Natural Catastrophes: In Brief

Dolores dissipates in Mexico after leaving three deaths from thunderstorms, Agencia EFE Affected in Colima 60 percent of the banana crop, Quadratín Colima CFE reestablishes service in areas affected by 'Dolores', Milenio Servicio Meteorológico Nacional (SMN) Disaster Management Division, Ministry of Home Affairs, India Insurance Council of New Zealand More than 300 insurance claims follow Saturday's Auckland tornado, Stuff News Auckland tornado: Why it happened, and why we weren't warned, Stuff News The Crimean authorities have estimated the damage from the flood at 5.5 billion rubles. Kommersant Ministry of Water Resources, China Record Rainfall Raises River Levels, Flood Risk in Northeast China, Sixth Tone

Many rivers have exceeded historical floods. How long will the rain in the Northeast continue?, China News Network

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