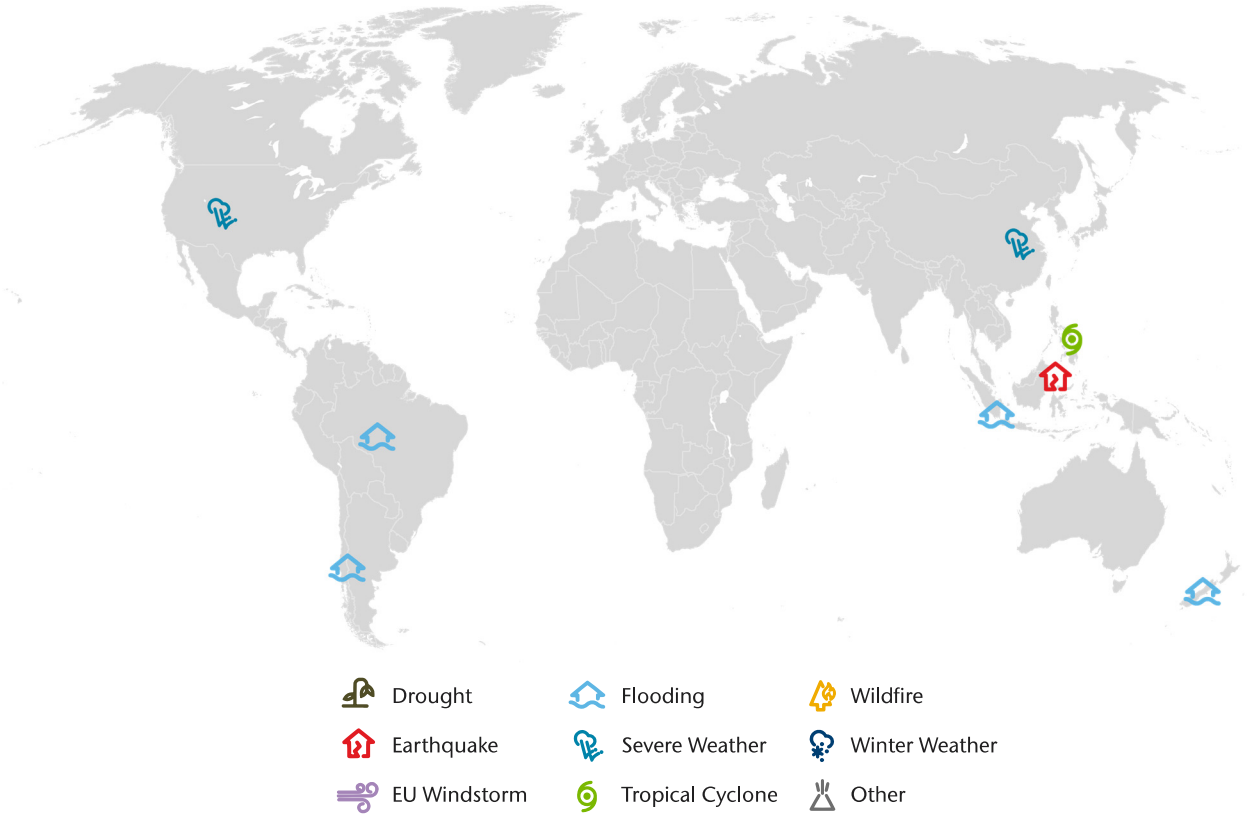
Weekly Cat Report

June 4, 2021

This Week's Natural Disaster Events



Event	Impacted Areas	Fatalities	Damaged Structures and/or Filed Claims	Preliminary Economic Loss (USD)*	Page
Flooding	New Zealand	0	Thousands	10s of million	3
Flooding	Indonesia	0	4,100	Millions	5
Severe Weather	China	1	Hundreds	Negligible	5
Severe Weather	United States	1	Thousands	Millions	5
Flooding	Chile	0	Hundreds	Unknown	5
Earthquake	Indonesia	0	Unknown	Unknown	5
Flooding	Brazil	0	Thousands	Millions	6
TS Choi-wan	Philippines	8+	Hundreds	Millions	6

**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.*

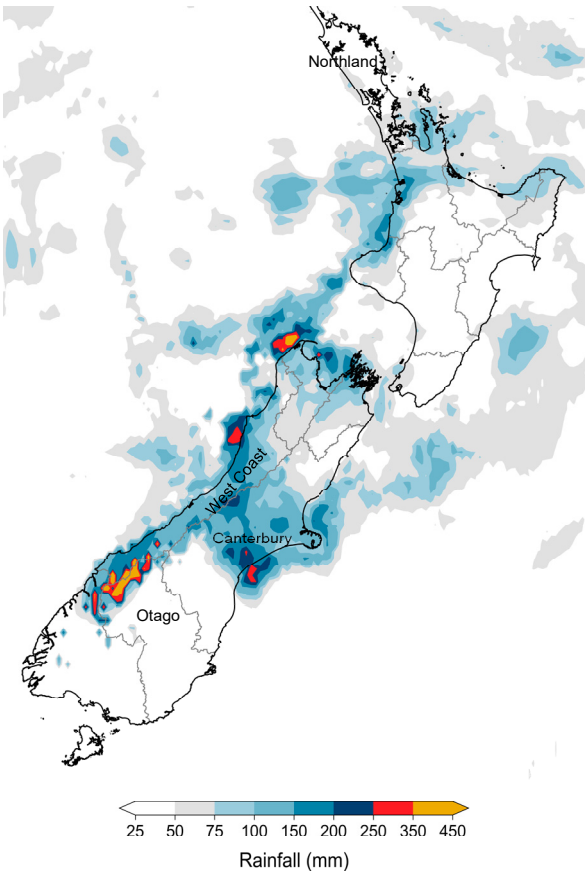
Along with this report, we continue to welcome users to access current and historical natural catastrophe data and event analysis on Impact Forecasting's Catastrophe Insight website: http://catastropheinsight.aon.com

One-in-100-year deluge affects Canterbury, New Zealand

New Zealand's South Island was hit by 'one-in-100-year' flooding event, as multiple deep low-pressure systems brought heavy precipitation to central and western parts of the country from May 29 to June 1. Localized flash floods destroyed several bridges, while numerous roads and highways were rendered impassable due to damage caused by landslides and waterlogging. Roughly 300 households were evacuated from the worst-affected areas of the Canterbury Region. Thousands of structures along with an extensive area of cropland were damaged or destroyed. Total economic losses were likely to be into the tens of millions USD.

Meteorological Recap

Satellite estimates of precipitation; May 28 – June 2
Data: GPM, NASA; Graphic: Aon (Impact Forecasting)



Torrential rains which started on May 29 and continued into June 1 triggered severe flash floods and prompted landslides across New Zealand. Among the worst affected administrative regions included Canterbury, West Coast, Northland, Otago, and Auckland. As the **La Niña** conditions in the Pacific waned towards the end of northern hemispheric wintertime, **sustained drought conditions** accompanied by a **high-pressure** area were reportedly holding onto New Zealand.

While this high-pressure region grew stronger, multiple **deep low-pressure** systems both from tropics and sub-tropics ran inland. The **Madden-Julian Oscillation (MJO)**, located in the Equatorial Western Pacific, aided in the intensification of moist winds coming from the tropics. The interaction resulted in atmospheric instability and subsequently generated a "**one-in-100-year**" flood event in central parts of New Zealand. A 100-year flood event corresponds to a flood which has a one percent chance of occurring in any given year.

Of particular note, was the movement of a warm and moisture containing low-pressure system from the northeast – also known as an **Atmospheric River** – which poured enormous precipitation totals across eastern parts of the Southern Alps between May 29 to June 1, resulting in as severe as a "one-in-250-years" flood in some parts of the Canterbury region. *An Atmospheric River is a concentrated flow of warm and moist air which brings heavy rainfall to the impacted regions.*

According to the New Zealand's MetService, several weather observatories in the New Zealand registered higher rainfall totals between May 29-31, then which typical falls the entire season - with the most notable observations from the Christchurch, Ashburton, Methven, Timaru, and Culverden regions. In addition, heavy rainfall accumulations were registered across the West Coast, western Otago, and Auckland regions.

Event Details

Flooding in Akaroa Town, Christchurch
Source: Christchurch City Council

Torrential rainfall triggered heavy flash floods and prompted landslides across South Island of New Zealand, with the most pronounced impacts registered in the **Canterbury** region. Thousands of residents from Canterbury, including the town of Springfield in the Selwyn district, were evacuated from their homes as heavy rainfall totals raised water levels. New Zealand's official meteorological agency, MetService, issued Red Warnings for Canterbury, while the local Civil Defense Emergency Management Group placed the Canterbury region under a state of emergency due to the impacts from the historic flash flooding. Red Warnings in New Zealand are the highest on the color-coded alert system and are generally issued in cases of extreme weather events, such as extra-tropical cyclones, in which significant impacts are anticipated.

Heavy rainfall allowed several rivers to break their banks, causing widespread inundation. Several highways, offices, and dozens of schools remained closed for multiple days. Local disaster officials along with New Zealand's defense personnel deployed helicopters to rescue people stranded by floods in the **Ashburton** area, where more than 35,000 residents were left isolated after floodwaters damaged the main bridge joining the town with the South State Highway. In addition, more than 1,000 households were left without power across **Christchurch**. Local officials announced that the government will provide NZD500,000 (USD360,000) for flood recovery and restoration efforts.

Initial damage assessments suggest a particularly hard-hit situation for farmers in the Canterbury region, as high waters resulted in broken fences, debris across fields, and lost feed. The most substantial impacts occurred on the farms along the riverbanks, as heavy discharge from the flooded rivers swept away thousands of kilometers of fences and left the crops inundated. These floods occurred during the start of New Zealand's dairy season when many farming employees are moving to new farms.

As per the local media reports, notable damage to thousands of outbuildings, bridges, railway tracks, businesses, and roads were observed. In addition, thousands of hectares (acres) of agricultural land across the region of Canterbury were destroyed. As the waters in the rivers slowly recede and severely affected communities in the Canterbury region become accessible, a more complete picture of the damage situation will emerge in the coming days to weeks.

Financial Loss

With damage assessments in the early stage, it remains too preliminary to provide economic loss estimate as of this writing. However, given the substantial damage situation in New Zealand, particularly in the Canterbury region, the overall economic impacts were likely to minimally reach into the tens of millions USD.

Initial reports indicated that more than 2,000 insurance claims, worth millions of USD, had already been filed. Given the substantial footprints of the event on both private and public infrastructure, the insurance sector was expected to minimally register thousands of claims on residential property, vehicles, and in the agricultural sector.

Natural Catastrophes: In Brief

Flooding (Indonesia)
Flooding affected the Indonesian provinces of South Sumatra and Central Java last week, resulting in notable damage. Heavy rains triggered flash floods in the Musi Rawas Regency of South Sumatra Province on May 27, while tidal flooding impacted villages across North Semarang District, Central Java Province on May 29. According to the National Disaster Management Agency of Indonesia (BNPB), tens of thousands of residents were critically affected, and more than 4,100 combined houses were either damaged or destroyed in rain-related incidents. Severe losses were inflicted in the agriculture sector.

Severe Weather (China)
Inclement weather conditions impacted northeast China's Heilongjiang Province on June 1. The most pronounced hazards included several isolated tornadoes, large hail, and damaging winds. According to the China's Ministry of Emergency Management, one person was killed,16 others were injured, and more than 160 houses were damaged in the wake of the event. A vast area of cropland was also affected.

Severe Weather (United States)
Upper level energy combined with southerly flow and an abundantly moist airmass enhanced severe weather across the southern High Plains between May 29-31. Portions of Colorado, New Mexico, Oklahoma, and Texas were particularly impacted by several rounds of slow-moving storms, which generated large hail, severe straight-line winds, flash flooding, and isolated tornadoes. Hail approaching and exceeding 2.0 inches (5.1 centimeters) in diameter were reported in Oklahoma (Cimarron County) on May 29, and in Texas (Crane County) on May 31. No less than 15 tornadoes were confirmed between May 30-31 in portions of Texas and Oklahoma. Many of the tornadoes touched down in rural areas and open grasslands resulting in negligible impacts. Heavy rainfall resulted in notable flooding across regions of southern New Mexico by May 30-31 – including localities near Roswell and Albuquerque. At least one fatality in the state was reported due to the flooding. Total economic losses were anticipated to reach into the millions (USD).

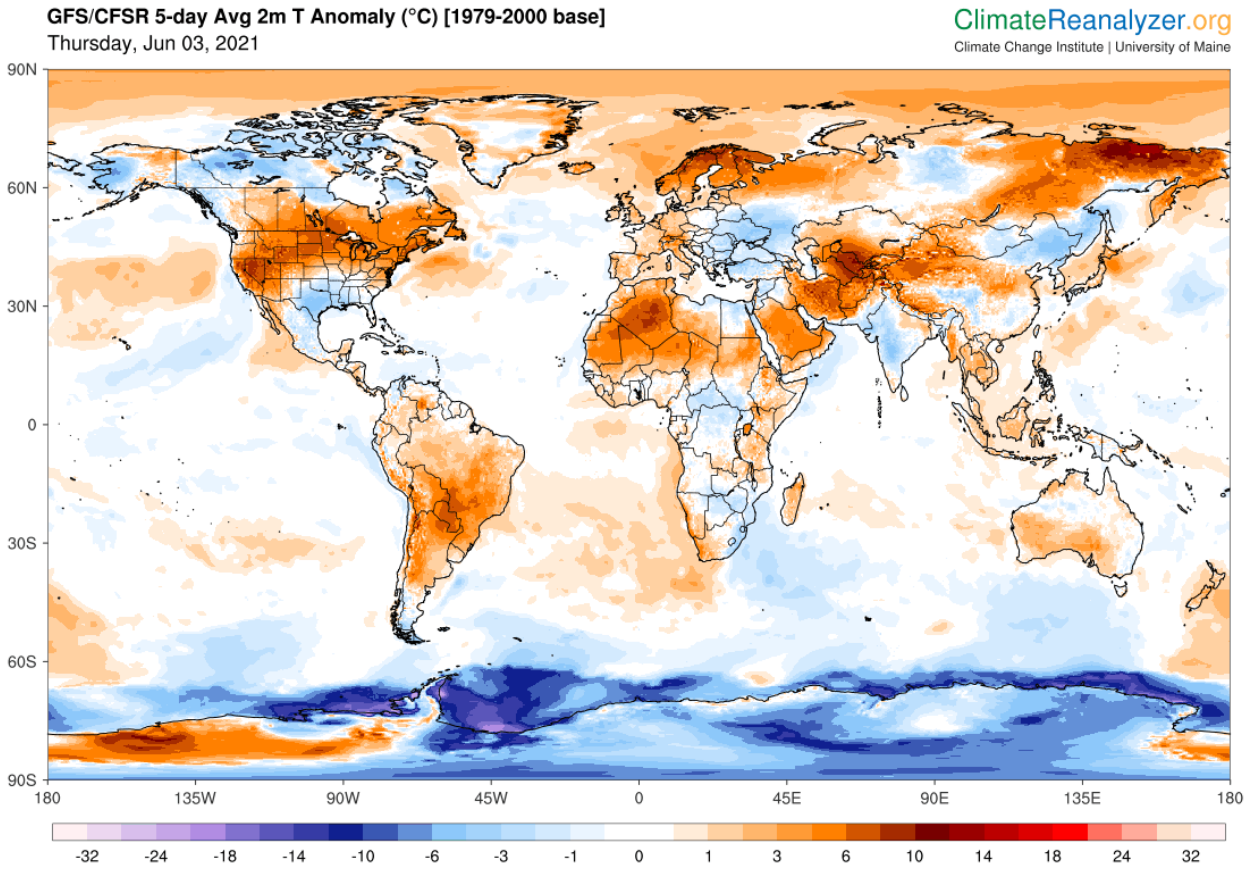
Flooding (Chile)
A frontal system generated heavy rainfall and flooding across portions of south-central Chile on June 1. The Biobío, Araucania, Los Ríos, and Los Lagos Regions were among the most affected. No less than 15,000 customers lost power as a result of the adverse weather. A weather station near Cañete in the Biobio Region reported a 24-hour rainfall total of 137 millimeters (5.4 inches). Landslides and rising river levels prompted dozens of evacuations. Numerous residencies and structures were damaged to varying degrees. In the wake of the event, at least 4,000 residents in the Araucania Region were left without access to clean drinking water.

Earthquake (Indonesia)
A magnitude-6.1 (USGS) tremor struck off the Indonesia's Maluku Islands on June 3 at 10:09 UTC (05:09 PM local time). The epicenter of the earthquake was located approximately 12 kilometers (79 miles) west-southwest of the Ternate Island at a moderate depth of 31 kilometers (19 miles), per the United states Geological Survey (USGS). Preliminary assessment reports cited widespread impacts to both private and public infrastructure.

Flooding (Brazil)
Heavy rainfall associated with lingering La Niña conditions continued to enhance historic flooding across the Amazon region of Brazil through early June. The Negro River near Manaus, which had been steadily rising for weeks, reached a historic crest of 29.98 meters (98.36 feet) on June 1. This surpassed the previous record level of 29.97 meters (98.33 feet) reached in 2012; records at this location extend back to 1902. Additionally, the highest alert level, severe flood, was exceeded along stretches of the Solimoes and Amazon Rivers. Government officials reported no less than 450,000 people were affected by the flooding. Thousands of residents were displaced throughout the region. Significant impacts to homes, businesses, and the transportation sector were observed. Damage assessments remain ongoing, while flooding concerns are anticipated to continue in the coming weeks.

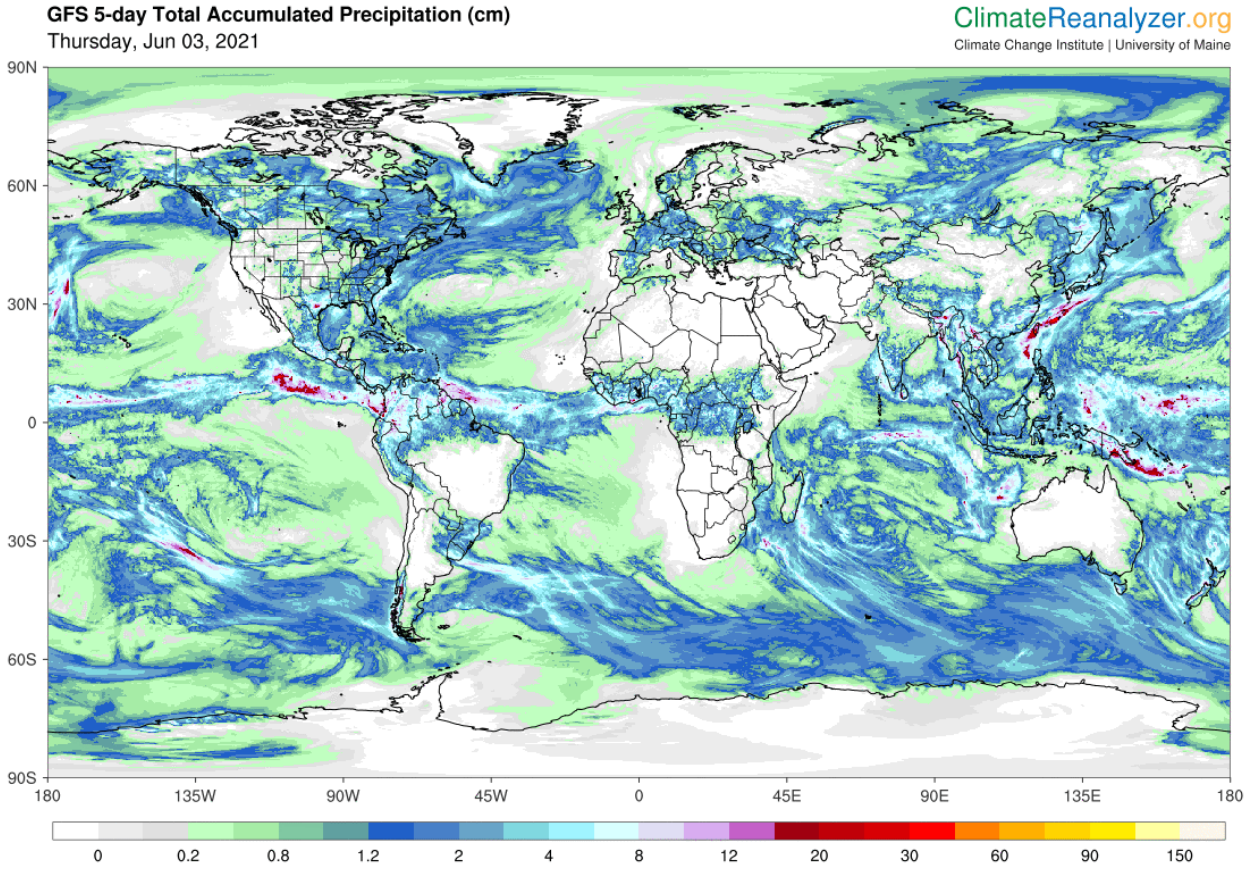
Tropical Storm (Philippines)
Tropical Storm Choi-wan, known locally as Dante, first made landfall near Sulat in the Eastern Samar Province of the Philippines on June 1 as a minimal tropical storm, according to data from the Joint Typhoon Warning Center (JTWC). The storm was later downgraded to a tropical depression and subsequentially made seven additional landfalls in Masbate, Romblon, Oriental Mindoro, and Batangas Provinces through June 2, before emerging over the South China Sea. As of this writing, Choi-wan resulted in at least eight fatalities and several injuries, while 15 people remained missing. According to information provided by the National Disaster Risk Reduction and Management Council (NDRRMC), 45,456 people were affected by the storm, of which 12,071 took shelter in evacuation centers. Strong winds and locally heavy rainfall generated by Choi-wan resulted in landslides and notable flooding throughout central and southern portions of the Philippines. Widespread impacts to infrastructure, homes, and agriculture were reported. Damage assessment remain ongoing.

Global Temperature Anomaly Forecast



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

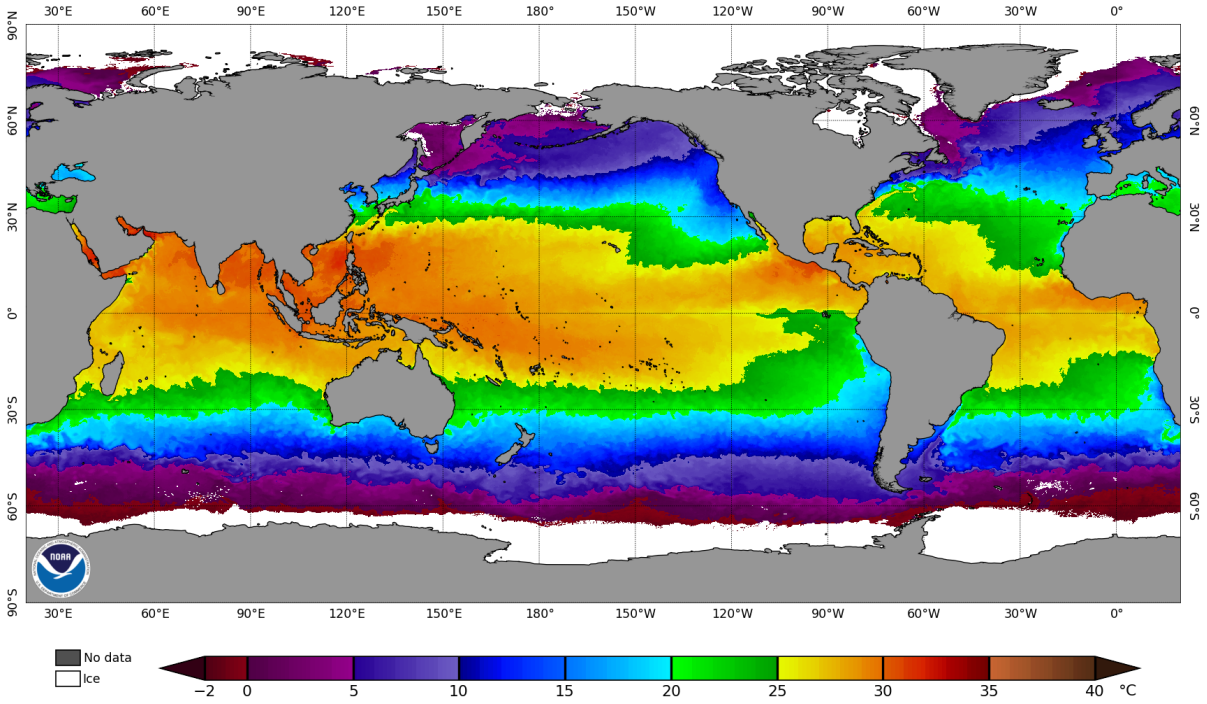
Global Precipitation Forecast



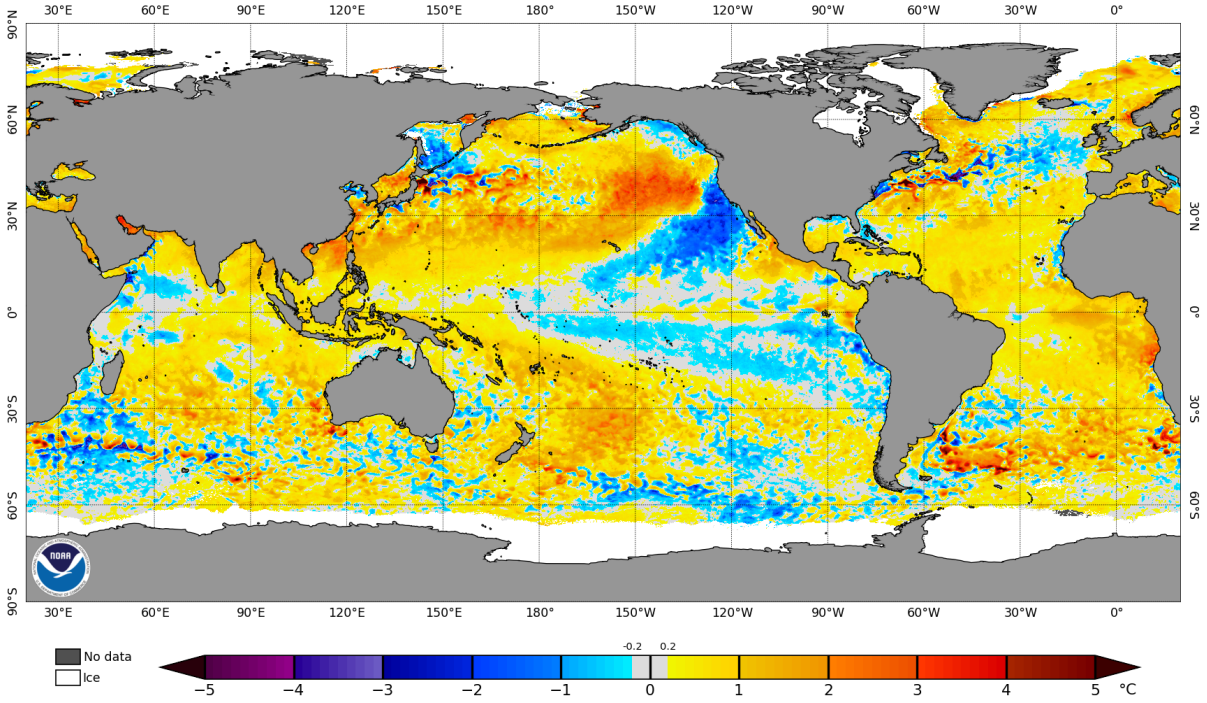
Source: Climate Reanalyzer, Climate Change Institute, University of Maine, USA

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

NOAA Coral Reef Watch Daily 5km Sea Surface Temperatures (v3.1) 2 Jun 2021

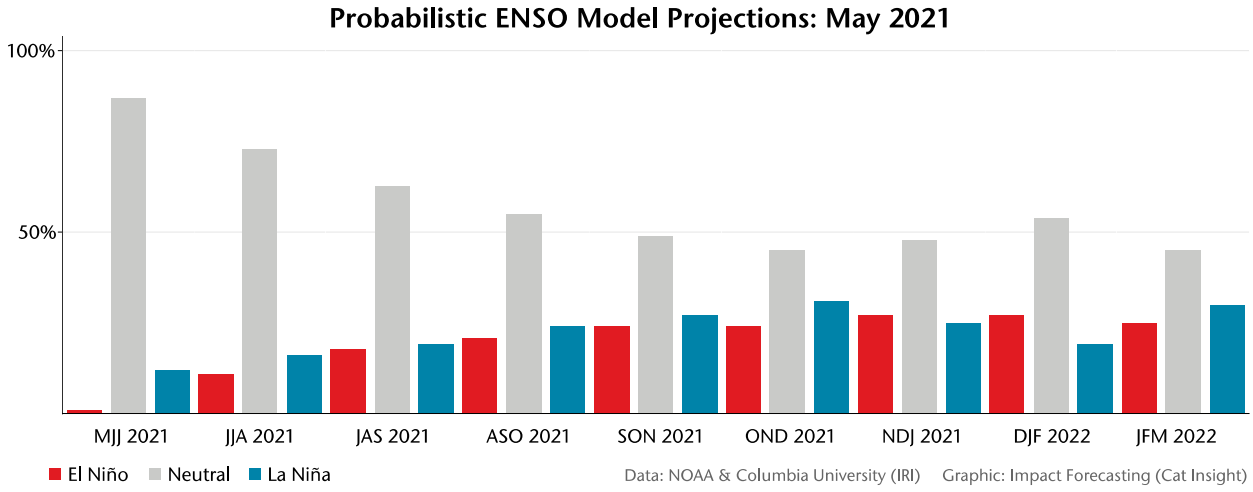


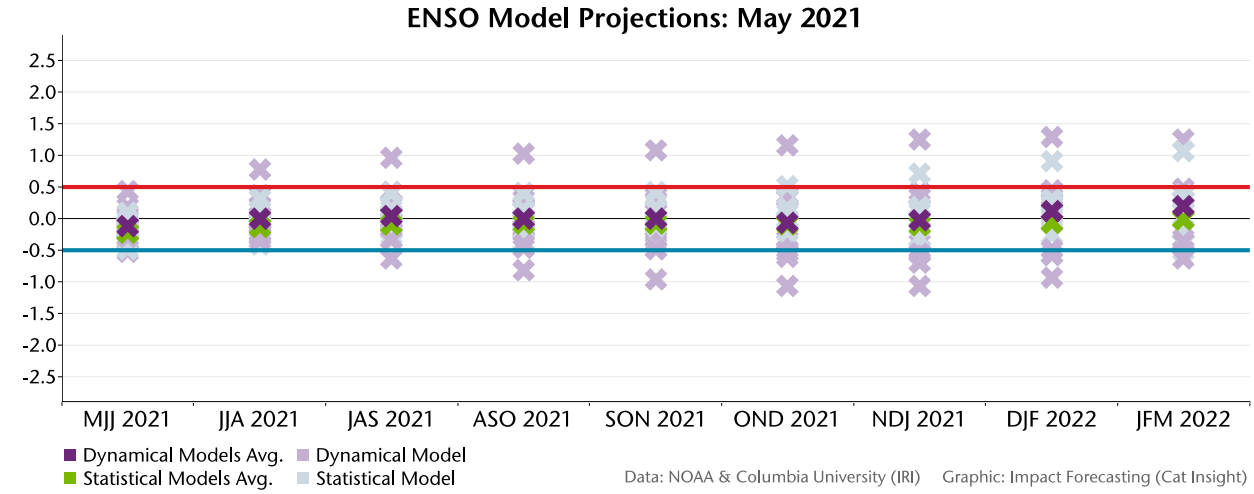
NOAA Coral Reef Watch Daily 5km SST Anomalies (v3.1) 2 Jun 2021



El Niño-Southern Oscillation (ENSO)

ENSO-neutral conditions are currently present. NOAA notes a 67 percent chance that these neutral conditions will persist through the Northern Hemisphere summer (June-August).





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.*

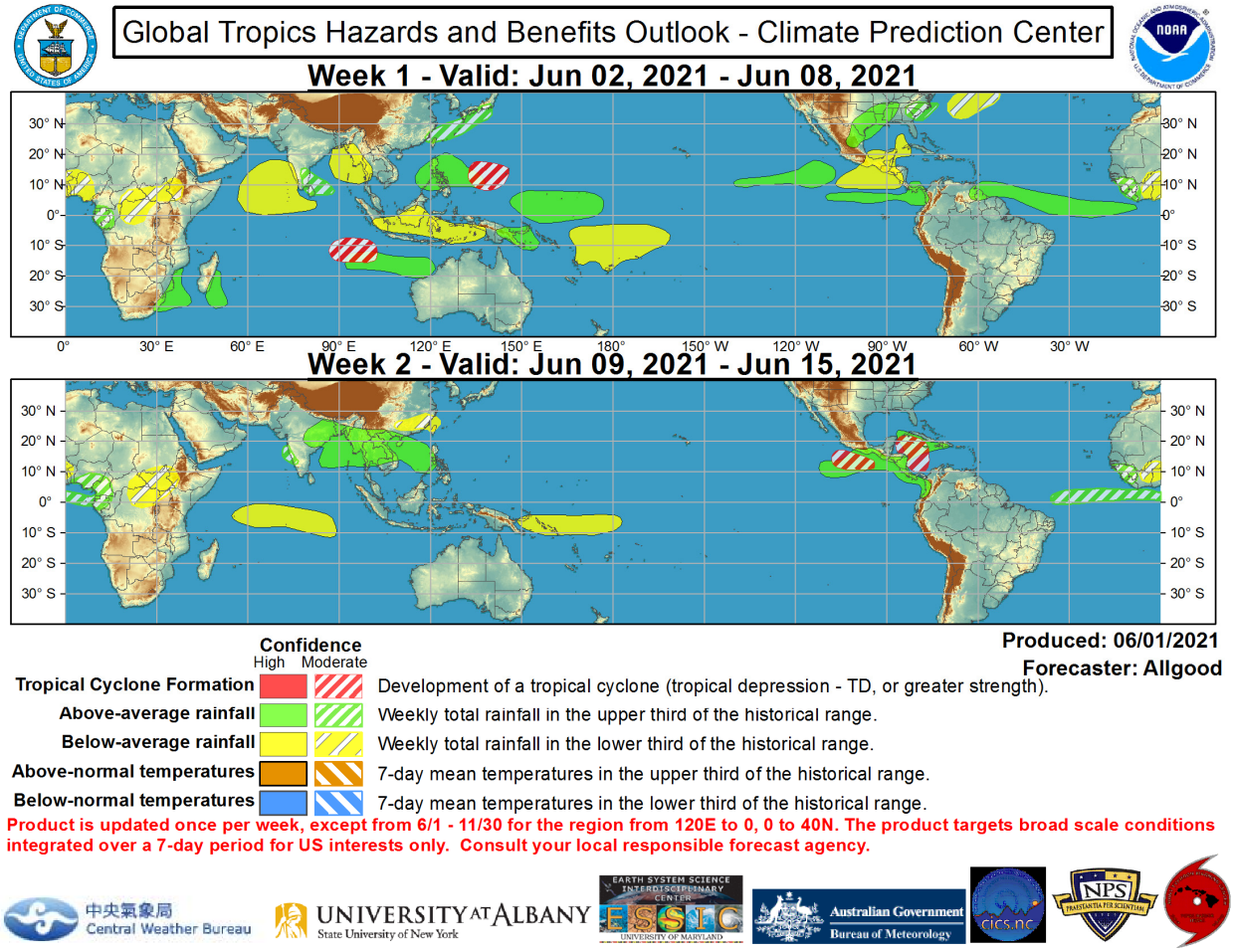
La Niña *refers to the periodic cooling of sea-surface temperatures (-0.5°C) across the east-central equatorial Pacific. It represents the cold phase of the ENSO cycle.*

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.*

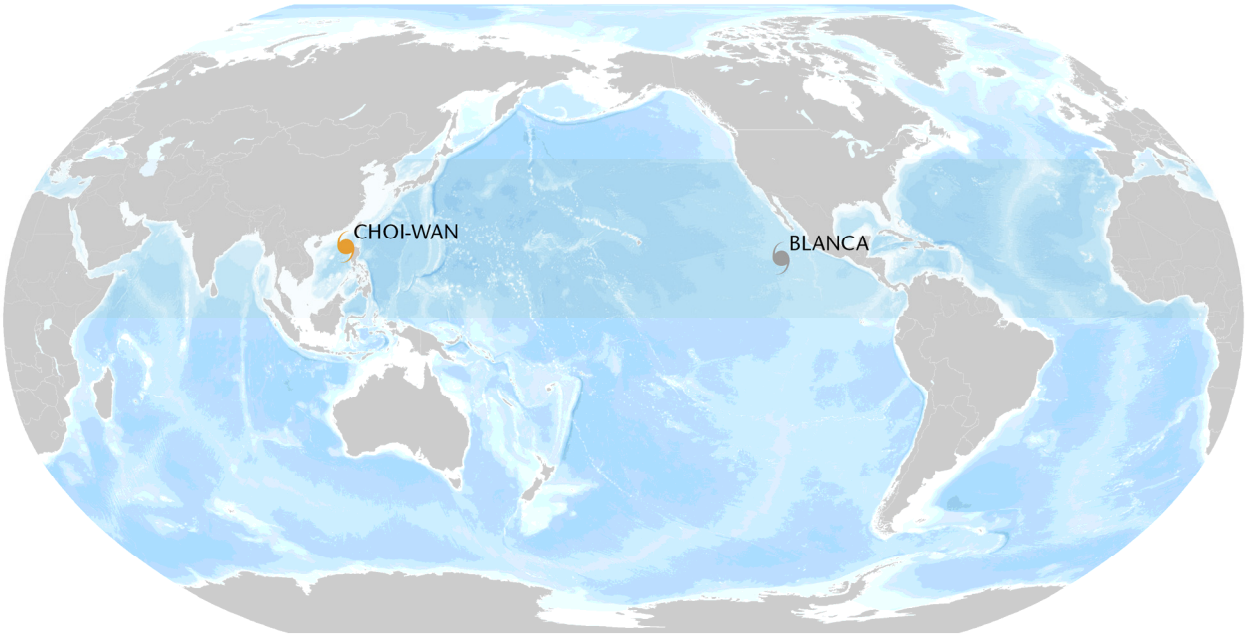
El Niño (La Niña) is a phenomenon in the equatorial Pacific Ocean characterized by a five consecutive 3-month running mean of sea surface temperature (SST) anomalies in the Niño 3.4 region that is above the threshold of +0.5°C (-0.5°C). This is known as the Oceanic Niño Index (ONI).

Global Tropics Outlook



Source: Climate Prediction Center

Current Tropical Systems



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

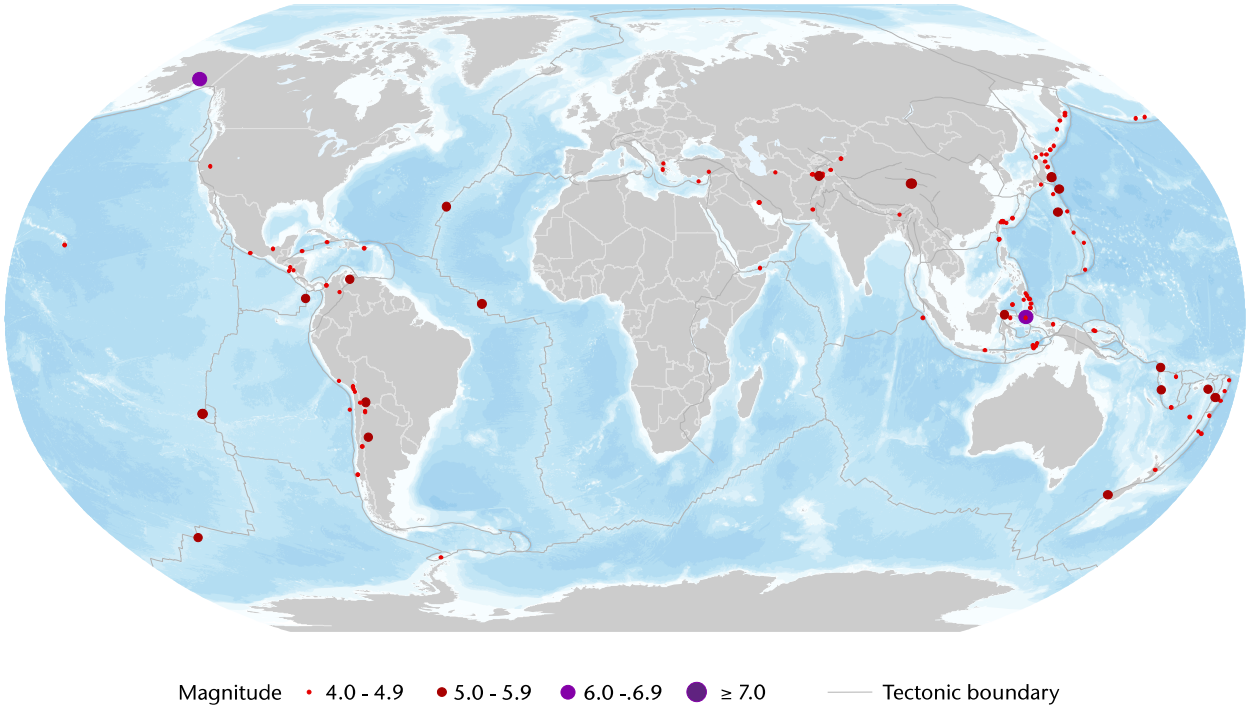
Location and Intensity Information

Name*	Location	Winds	Storm Reference from Land	Motion**
TD Blanca	15.7°N, 113.7°W	35 mph	620 miles (1000 kilometers) S from La Paz, Mexico	W at 3 mph
TS Choi-wan	18.6°N, 118.2°E	40 mph	215 miles (350 kilometers) NW from Baguio City, Philippines	N at 14 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): May 28 – June 3

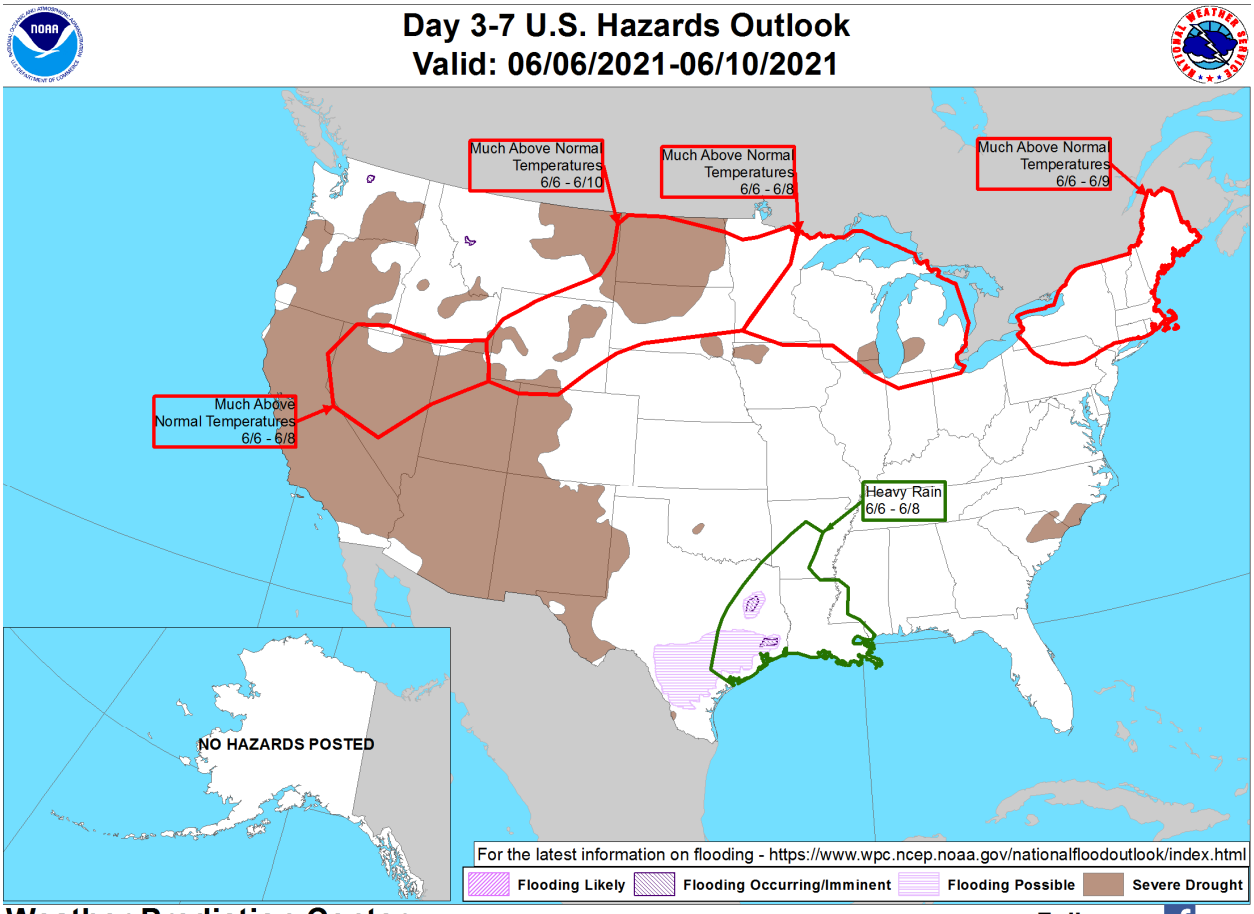


Significant EQ Location and Magnitude (≥M6.0) Information

Date (UTC)	Location	Magnitude	Depth	Epicenter
05/31/2021	62.45°N, 148.25°W	6.1	44 km	73 kilometers (45 miles) N of Chickaloon, Alaska
06/03/2021	0.31°N, 126.34°E	6.1	10 km	12 kilometers (7 miles) WSW of Ternate, Indonesia

Source: United States Geological Survey

U.S. Weather Threat Outlook

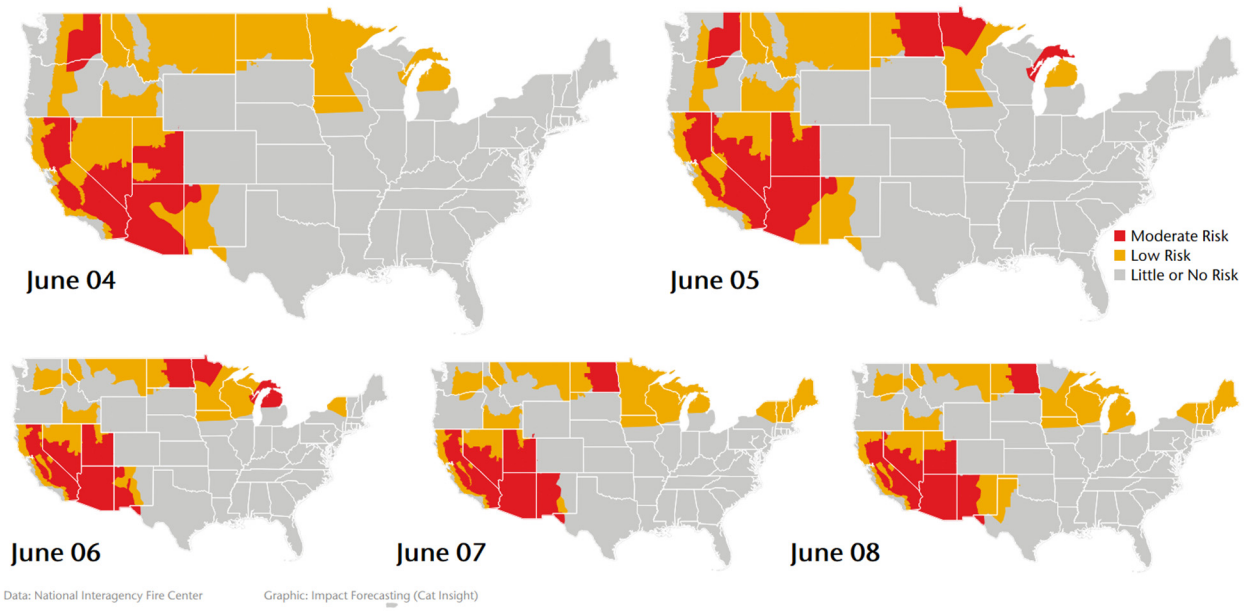


Potential Threats

- Northward moisture advection associated with a meandering upper level low and frontal system will lead to heavy rainfall across portions of the Southern Plains and Lower Mississippi Valley between June 6-8, before expanding northeastward.
- Additional rainfall will enhance ongoing flooding concerns in region of southern and eastern Texas throughout the medium range period.
- A strong upper level ridge will bring much above normal temperatures to widespread areas spanning from the Great Basin and Rockies to the Northeast between June 6-10. The heat will be longest lasting across portions of the Rockies, Plains, and Upper Mississippi Valley.
- Exceptional drought conditions continue to persist across the Western and Southwestern United States.

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

The National Interagency Fire Center has highlighted a more expansive portion of the country facing potential fire risk during the next week. A period of extended heat will affect a broad portion of the U.S. spanning from the Great Basin into the Northern Plains and Midwest. A record setting heatwave over the past week enhanced wildfire risk across portions of California and the Desert Southwest, where record drought conditions persist.



Annual YTD Wildfire Comparison: June 3*

Year	Number of Fires	Acres Burned	Acres Burned Per Fire
2017	25,087	2,221,336	88.55
2018	24,353	1,725,561	70.86
2019	15,148	280,661	18.53
2020	19,344	467,773	24.18
2021	25,769	711,648	27.62
10-Year Average (2011-2020)	**22,038**	**974,550**	**44.22**

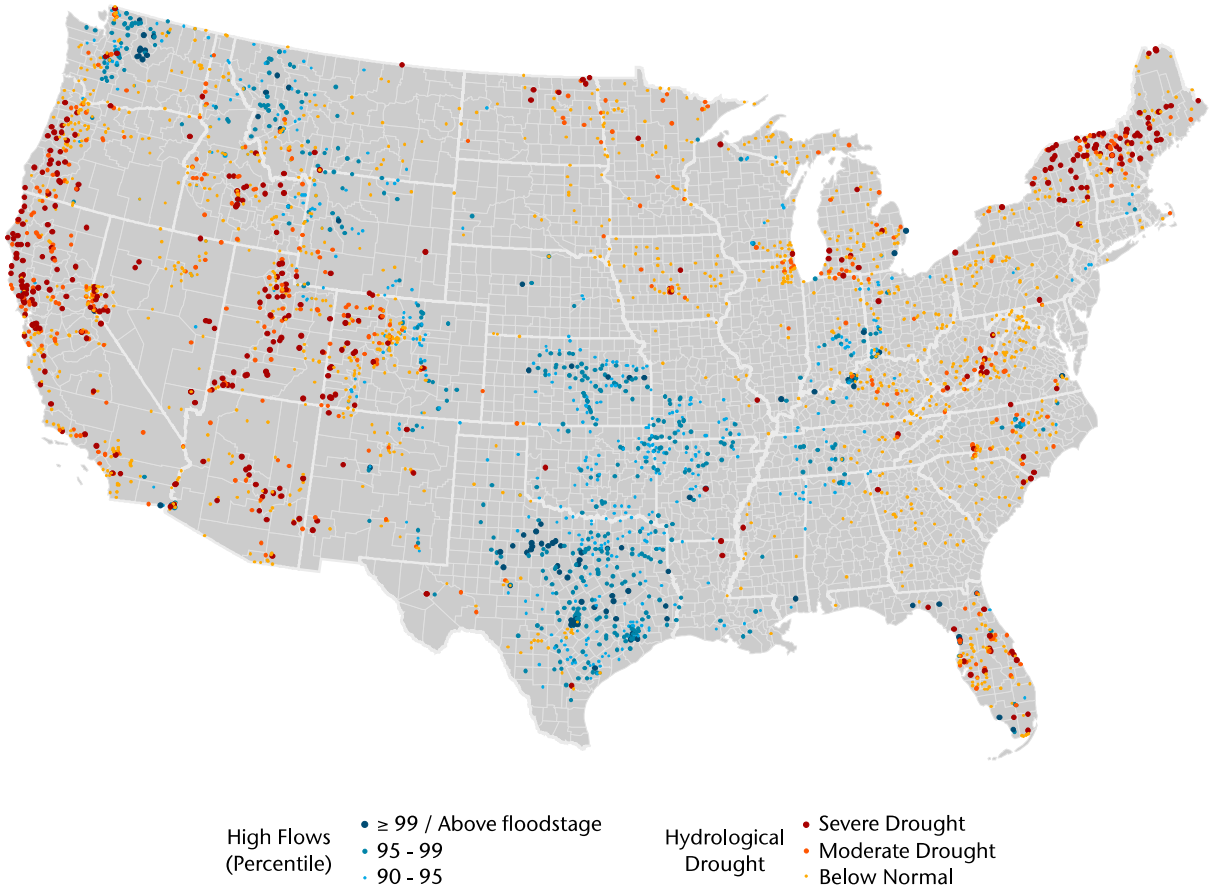
Source: National Interagency Fire Center

Top 5 Most Acres Burned by State: June 3

State	Number of Fires	Acres Burned	Acres Burned Per Fire
Oklahoma	1,000	83,746	83.75
Florida	1,464	68,707	46.93
New Mexico	290	63,644	219.46
Texas	2,111	63,446	30.05
Arizona	693	40,318	58.18

Source: National Interagency Fire Center

Current U.S. Streamflow Status



A ≥99th 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
Ouachita River at Remmel Dam above Jones Mill, Arkansas	10.10	98.90
Clear Fork Brazos River at Fort Griffin, Texas	40.00	98.78
Pond Creek Near Louisville, Kentucky	11.17	98.68
Beargrass Creek at Old Cannons Lane at Louisville, Kentucky	5.41	98.67
Big Nance Creek at Courtland, Alabama	6.73	98.67

Source: United States Geological Survey

Source Information

One-in-100-year deluge affects Canterbury, New Zealand

MetService
Civil Defence Emergency Management Group
Evacuations in New Zealand, DW News
New Zealand flooding, The Guardian
NZ getting drier as annual rainfall slumps, Stats NZ says, Stuff News
Rising rivers explained: Canterbury experiencing 'atmospheric river', Stuff News
Weather: What caused the Canterbury flood? Three questions answered, NZ Herald
Wetter winter coming: Why NZ can expect more 'atmospheric rivers', NZ Herald
Canterbury flooding: Historic Grigg family farm wiped out by worst rain they've ever seen, NZ Herald
Claims to insurers mount as Canterbury tallies flood and rain damage, Stuff News

Natural Catastrophes: In Brief

National Disaster Management Agency, Indonesia
Ministry of Emergency Management, China
Significant flooding reported in parts of New Mexico, KRQE
U.S. National Weather Service
U.S Storm Prediction Center
United States Geological Survey (USGS)
Chile – Floods Prompt Rescues and Evacuations in South-Central Regions, Floodlist
Yellow Alert decreed for Lota after flooding by frontal system, Biobio Chile
Close encounter with deadly tornado caught on camera, Yahoo News
Brazil – Severe Flooding in Amazonas State Affects 450,000 People, Floodlist
Brazil – Rio Negro Reaches Record Highs in Manaus, Floodlist
National Disaster Risk Reduction and Management Council (NDRRMC)
Joint Typhoon Warning Center (JTWC)
Dante leaves 3 dead, nearly P15 million worth of damage in agriculture, ABS CBN
National Disaster Risk Reduction and Management Council (NDRRMC), Manilla Times
Tropical storm Choi-wan leaves at least 8 dead in Philippines, Xinhuanet

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