Weekly Cat Report
January 19, 2018
This Week’s Natural Disaster Events

<table>
<thead>
<tr>
<th>Event &amp; Region</th>
<th>Fatalities</th>
<th>Damaged Structures or Filed Claims</th>
<th>Est. Economic Loss (USD)</th>
<th>Specific Areas</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter Weather - United States</td>
<td>16+</td>
<td>Thousands</td>
<td>Millions</td>
<td>Plains, Midwest, Southeast, Northeast</td>
<td>3</td>
</tr>
<tr>
<td>WS Friederike - Europe</td>
<td>9+</td>
<td>Thousands</td>
<td>100s of Millions+</td>
<td>Western &amp; Central Europe</td>
<td>5</td>
</tr>
<tr>
<td>CY Berguita - Africa</td>
<td>0</td>
<td>Thousands</td>
<td>10+ million</td>
<td>Mauritius, La Reunion</td>
<td>7</td>
</tr>
<tr>
<td>Earthquake - South America</td>
<td>2</td>
<td>2,000+</td>
<td>Millions</td>
<td>Peru</td>
<td>9</td>
</tr>
</tbody>
</table>

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: [www.aonbenfield.com/catastropheinsight](http://www.aonbenfield.com/catastropheinsight)
Latest winter storm brings snow/ice to the US South

Another winter storm brought accumulating snow and ice across southern sections of the United States this week, becoming the third-such instance this season. Temperatures again plunged to well below normal levels across the Plains and Southeast; while cold also gripped parts of the Midwest and Northeast. At least 16 people died due to storm-related incidents, and several others were injured. The most significant impacts resulted from power outages, transportation interruptions due to closed roadways or airports, and automobile accidents.

Meteorological Recap

Both the Weather Prediction Center (WPC) and local National Weather Service (NWS) offices began forecasting the likelihood of another winter storm impacting southern and eastern sections of the United States on January 12. In advance of the storm’s arrival, winter weather-related watches, warnings and advisories were issued from Texas to New England given the chance of accumulating snow, ice, sleet and risks associated with freezing rain.

Late on January 14 into January 15, an area of low pressure and associated cold front began to sink southward out of Canada into the northern Plains and Midwest. This spawned plentiful lake effect snow throughout the Great Lakes, particularly after the main low shifted south and winds turned from a northerly direction and crossed unfrozen waters. Later on January 15 into January 16 ample moisture ahead of the advancing cold front led to significant accumulating snowfall in parts of Kentucky, Arkansas and Tennessee.

During this time, the risk of freezing rain and sleet continued to increase in portions of Texas (including around Houston metro), Louisiana (including New Orleans), southern Mississippi, southern Alabama, and the Florida panhandle. On January 16, accumulations were confirmed as ice-covered roads led to major travel issues. For the third time this season, parts of the Deep South recorded measurable snowfall. With the main frontal boundary tracking towards the Atlantic Ocean, multiple areas of low pressure – in addition to mid/upper level atmospheric features working to enhance the precipitation impacts – developed along the Eastern Seaboard.

By January 17, the low pressure areas spawned accumulating snow from the Carolinas into northern New England. While not as significant as the winter storm from January 2-5, the storm system did spawn nearly one-foot of snowfall.

Selected storm total rainfall amounts from the Weather Prediction Center are given in the table below.

<table>
<thead>
<tr>
<th>Location</th>
<th>Snowfall (in.)</th>
<th>Location</th>
<th>Snowfall (in.)</th>
<th>Location</th>
<th>Snowfall (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loysville, PA</td>
<td>9.5</td>
<td>West Paducah, KY</td>
<td>8.1</td>
<td>Terra Alta, TN</td>
<td>7.0</td>
</tr>
<tr>
<td>Guthrie, KY</td>
<td>8.5</td>
<td>Hickory, KY</td>
<td>7.3</td>
<td>Erly, PA</td>
<td>6.5</td>
</tr>
<tr>
<td>Omaha, AR</td>
<td>8.5</td>
<td>Canaan, CT</td>
<td>7.0</td>
<td>Dover, NH</td>
<td>6.4</td>
</tr>
<tr>
<td>Rosendale Village, NY</td>
<td>8.4</td>
<td>Colrain, MA</td>
<td>7.0</td>
<td>Montague, NJ</td>
<td>6.3</td>
</tr>
<tr>
<td>Rhinebeck, NY</td>
<td>8.3</td>
<td>Paris, TN</td>
<td>7.0</td>
<td>Dexter, MO</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Event Details

The inclement weather was responsible for at least 16 fatalities: five in Louisiana, four in Texas, three in Georgia, two in North Carolina, one in West Virginia and one in Tennessee. Several of the fatalities were due to traffic accidents as thin layers of ice and snow covered roadways and led to sliding vehicles. In Louisiana alone, the state distributed more than 1.5 million pounds (680,000 kilograms) of salt to use on roadways. South Carolina put down nearly 480,000 gallons (1.8 million liters) of salt brine.

The snow and ice prompted numerous major thoroughfares closures including parts of Interstate 10 in Louisiana and Alabama, Interstates 12, 49 and 55 in Louisiana, and U.S. Highway 90 in Mississippi. In Georgia, the governor indicated that nearly three-quarters of all roads in the state were affected by slick conditions; while Mississippi noted icy roads in all 82 of the state’s counties.

A state of emergency was declared in Louisiana “due to the winter weather and dangerous conditions”, which also affected flights in several cities across the Southeast. Flight delays or cancellations were noted at airports in Atlanta (GA), Raleigh-Durham (NC), Charlotte (NC), Memphis (TN), New Orleans (LA), and Houston (TX). In total, nearly, 4,000 flights were cancelled.

Tens of thousands of power outages were reported throughout the Deep South as power lines and tree branches snapped under the weight of ice and snow. In other spots – such as rural Mississippi – utility companies asked customers to reduce energy use due to extremely high demand as temperatures plummeted well below the freezing mark in many typically warm locales.

Beyond physical damage to structures and vehicles, there were concerns among farmers and agricultural interests given the repeated bouts of cold and snow in recent weeks. Preliminary reports indicated that farmers had not incurred as much damage to citrus and vegetable crops as initially feared, but also cited that some impacts had already been sustained from hurricanes Harvey and Irma in 2017.
Windstorm Friederike causes high losses in Europe

An active windstorm season in Europe continued with another deep cyclone, which affected multiple Western and Central European countries on Thursday, January 18. At least nine fatalities were reported at the time of this writing and the financial impact of the storm is expected to be significant. Among the worst affected countries were Germany and the Netherlands. The storm reached Germany on the 11th anniversary of Windstorm Kyrill.

Meteorological Recap

The low pressure area that impacted multiple European countries on January 18 was named “Friederike” by the Free University of Berlin. The cyclone was first recognized on surface pressure charts while located south of Newfoundland on January 16. The storm took approximately 24 hours to cross the North Atlantic under the influence of a strong jet stream. The storm reached the United Kingdom during the night of January 17-18 and prompted the issuance of yellow wind warnings across Ireland and southern parts of the U.K.

On January 16, western portions of Ireland were battered by a separate low pressure system, which was named “Fionn” by Ireland’s Met Éireann and the U.K. Met Office. Ireland did not record any significant losses and the impact of the storm was minimal in the U.K.. On January 18, Friederike swept through Ireland and England with significant gusts, but local meteorological agencies took the decision not to issue a separate name for the storm, even though its impact was more significant than the impact of storm Fionn two days prior. The highest gusts that were measured in the U.K. reached 83 mph (133 kph) in Tibenham and 78 mph (125 kph) in Aberdaron.

The Royal Netherlands Meteorological Institute (KNMI) recorded a gust of 143 kph (89 mph) at Hoek van Holland. Wind gusts widely exceeded 100 kph (62 mph) across the central Netherlands. De Bilt station, located in central Netherlands, recorded the highest gust since Windstorm Daria swept through Western Europe in January 1990. The KNMI noted that Friederike was one of the strongest storms to ever impact the country. To a lesser degree, the storm also impacted neighboring Belgium. Winds gusted between 90 and 105 kph (56 and 65 mph) in the country and the effects of the storm were mostly felt in Flanders region.

The storm prompted Météo-France to issue an orange wind warning in the departments of Pas-de-Calais and Nord, and thus to give the storm its own name: “David”. As the storm moved over the European mainland, its core pressure dropped to 979 millibars. The highest wind speeds were observed on the southern flank of the storm as it traversed northern Germany in a general east-southeastward direction. The highest gust of the storm was recorded on the Brocken Mountain in Harz, Central Germany and reached 203 kph (126 mph), surpassing the value recorded during the passage of storm Kyrill in January 2007. The German Meteorological Institute (DWD) provided a preliminary summary of the highest gusts, which are given in the table below. The left-hand columns of the table show gusts observed by mountainous stations, while the right-hand columns show the top five gusts that were recorded by lowland stations.

Surface pressure analysis, January 18, 12:00 UTC (Source: DWD)
Event Details

Netherlands, Belgium, France

Orange (medium) wind warnings were issued for the Netherlands, but were later increased to the highest, red level in Gelderland and Overijssel during Thursday, January 18. Three fatalities were reported in Olst, Enschede and Vuren. Numerous flight cancelations and delays were reported from the country’s main airport at Schiphol. Notable damage was also incurred on railway overhead lines and the transport was practically paralyzed in much of the country. Road traffic was disrupted at numerous locations as dozens of trucks were overturned in strong winds. Initial reports from the country cited damage to property and motor that will likely end up well into the millions of EUR.

Several people were seriously injured in Belgium after being hit by falling branches or debris from buildings and one fatality was reported near Brussels. Local media reported numerous instances of structural damage, including roofs that were completely blown off buildings. This included both residential and commercial property. Damage was mostly confined to the northern regions. In France, the storm only affected the northernmost departments of Pas-de-Calais and Nord. At least 11,000 customers were left without power in the affected areas.

Germany

Five storm-related fatalities were reported from Germany at the time of this writing. Three of the casualties were in Nordrhein-Westfalen, one in Thuringen and one in Brandenburg. Dozens of people were injured across the country, some of them severely.

Initial reports indicated hundreds of roofs being destroyed or damaged. Fire brigade and emergency services responded to tens of thousands of storm related incidents; this number reached 7,000 in Nordrhein-Westfalen alone. Further damage is expected to the forestry sector, even though the trees are less prone to uprooting due to seasonal defoliation. Initial reports indicated notable forestry damage in the mountain range of Harz.

Widespread power outages occurred due to damage to the electricity grid and were estimated to be in the hundreds of thousands. In Nordrhein-Westfalen alone the number of outages reached 130,000. A nationwide closure of long-distance railway transport was called by Deutsche Bahn in the evening, due to numerous fallen trees and damage on the lines. Stormy weather also led to numerous flight cancellations at major airports, including Düsseldorf, Cologne and Munich. Travel was also disrupted on several major highways and many more regional roads.

Financial losses

The financial impact of Windstorm Friederike is yet to be determined, but will likely reach into the hundreds of millions of EUR.
Cyclone Berguitta drenches Mauritius, La Reunion

Cyclone Berguitta impacted the Indian Ocean territories of Mauritius and La Reunion from January 15-18 as it lashed the islands with torrential rainfall and brought damaging winds. There were no reports of any casualties but extensive damage to property and agriculture, largely due to flooding, was noted. Economic losses were expected to reach into the 10s of millions (USD).

Meteorological Recap

The system that would become Cyclone Berguitta was first recognized over the southwest Indian Ocean on January 11 while located approximately 800 kilometers (500 miles) southwest of the British Territory of Diego Garcia. Over the following 36 hours, Berguitta tracked toward the southeast before recurving and taking a track toward the southwest while slowly organizing and intensifying. On January 12 the system attained tropical storm-strength winds estimated at 65 kph (40 mph) and was named Berguitta by the Mauritius Meteorological Service.

Berguitta tracked in a west-southwestward direction over the following days, performing a small cyclonic loop on January 14-15 while located approximately 180 kilometers (115 miles) to the north of Rodrigues Island. Throughout the period Berguitta continued to intensify as it remained in a region of warm sea surface temperatures, low vertical wind shear, and good outflow aloft of the system. As it exited its loop Berguitta reached its peak intensity of 185 kph (115 miles) – equivalent to a major Category 3-strength storm on the Saffir Simpson Hurricane Wind Scale (SSHWS).

On January 17 Berguitta turned to track toward the southwest, taking it on a direct path toward the islands of Mauritius and La Reunion. By this time the cyclone’s winds had weakened somewhat and were estimated at 130 kph (80 mph) - equivalent to a Category 1-strength storm on the SSHWS.

Berguitta passed directly over Mauritius on January 18 and passed just to the southeast of La Reunion. It’s wind speeds were estimated at 120 kph (75 mph) throughout this period making it equivalent to a minimal Category 1-strength storm. At the time of this writing, Berguitta had weakened slightly and was located approximately 135 kilometers (85 miles) southwest of La Reunion and was a tropical storm-strength system. It was forecast to continue tracking toward the southwest over the next 12 hours before recurving and accelerating into the southern Indian Ocean. It was not expected to reintensify.

Event Details

Berguitta brought powerful wind gusts and torrential rainfall to Mauritius and La Reunion through January 18 and 19. Selected peak wind gusts and 24-hour rainfall totals from the Mauritius Meteorological Service and Meteo-France (La Reunion) are given in the following tables. Note that the rainfall totals for Mauritius are for the 24-hour period ending at 01:00PM MUT local time (09:00 UTC) on January 18 while the rainfall totals for La Reunion are for the 24-hour period ending at 01:00AM RET local time (21:00 UTC, January 18) on January 19.
Rodrigues Island, part of the Republic of Mauritius, endured extensive flooding and damage to infrastructure as Berguitta passed to the north of the island on January 15. Several villages were submerged and hundreds of residents were left without power. There were no reports of any casualties from the island.

Extensive damage was noted across Mauritius with communities in the east faring the worst. Flooding and damage due to toppled trees and flying debris was widely reported while severe disruption to flights was also noted. There were no specific damage details available as of this writing as officials had yet to undertake damage surveys.

A total of 72,000 households in La Reunion were left without power on January 18 though most had been reinstated at the time of this writing. Several hundred residents were also evacuated due to flooding, particularly in Saint-Pierre where the River D’Abord was in a state of flood for several hours. Government officials declared a state of calamity as they announced that they expected the cyclone would have taken a heavy toll on property and on the island’s agricultural sector.

Financial Losses

There were no estimates available of the financial impact of Berguitta at the time of this writing as officials were yet to undertake comprehensive damage surveys. Based on the scope of damage from preliminary reports it is expected that economic losses will reach into the 10s of millions (USD).
Peru earthquake leaves 100+ injured

On January 14 a magnitude-7.1 earthquake struck just offshore from the northern coast of Arequipa department, Peru. The tremor was recorded by the United States Geological Survey at 04:19AM CET local time (09:19 UTC) at a depth of 36.3 kilometers (22.6 miles). Tsunami warnings were immediately issued for multiple Pacific nations but were later cancelled as no notable waves were observed. At least two people were killed by the temblor while 139 others were injured, the majority of who were in Caraveli province. Officials reported that 259 homes were destroyed, displacing hundreds of families. In total, 1,956 homes and other structures were damaged or destroyed.

Event Details

A major magnitude-7.1 earthquake struck just offshore from the northern part of Arequipa region in central Peru during the early hours of January 14. The quake was recorded by the United States Geological Survey (USGS) at 04:19AM CET local time (09:19 UTC) approximately 40 kilometers (25 miles) south-southwest of the town of Acari at a relatively shallow depth of 36.3 kilometers (22.6 miles). The shallow event occurred along the boundary between the South American and Nazca tectonic plates. The tremors were felt in coastal areas of Peru.

Two people were killed by the quake: one in Quicacaha district, Caraveli province (Arequipa department) and one in Lucanas province, Ayacucho department. A total of 139 people were injured including 29 in Acari district, Caraveli province and 27 in Nazca district of Nazca province (Ica department).

Some 270 families were made homeless as their homes were destroyed or rendered uninhabitable by the tremor. A further 1,577 families were affected. A summary of destroyed and damaged homes and other buildings by province is given in the table below. The hardest hit area was Caraveli province in Arequipa department.

<table>
<thead>
<tr>
<th>Department</th>
<th>Province</th>
<th>Destroyed</th>
<th>Homes Uninhabitable</th>
<th>Damaged</th>
<th>Total Homes Affected</th>
<th>Total Public Buildings Affected</th>
<th>Public Buildings Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arequipa</td>
<td>Caraveli</td>
<td>205</td>
<td>1,109</td>
<td>1,314</td>
<td>64</td>
<td>1,378</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Camana</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Condesuyos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ayacucho</td>
<td>Lucanas</td>
<td>19</td>
<td>1</td>
<td>183</td>
<td>203</td>
<td>10</td>
<td>213</td>
</tr>
<tr>
<td></td>
<td>Paucar del Sara</td>
<td>1</td>
<td>3</td>
<td>134</td>
<td>138</td>
<td>11</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>Paucar del Sar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ica</td>
<td>Parinaocochas</td>
<td>34</td>
<td>7</td>
<td>143</td>
<td>184</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>San Pedro de las</td>
<td>1</td>
<td>3</td>
<td>134</td>
<td>138</td>
<td>11</td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>Condesuyos</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>259</td>
<td>11</td>
<td>1,577</td>
<td>1,847</td>
<td>107</td>
<td>1,956</td>
</tr>
</tbody>
</table>

Damage was additionally cited to almost 12 kilometers (7.5 miles) of roads and to one bridge in Yauca district, Caraveli province. Potable water supplies were affected in Jaqui and Lomas districts, Caraveli; Rio Grande district, Condesuyos; Sancos district, Lucanos province; and Pullo district, Parinacochas province.
Seismological Background

The USGS provided the following tectonic summary of the event:

“The January 14, 2018, M 7.1 earthquake offshore southern Peru occurred as the result of shallow thrust faulting on or near the boundary between the South America plate and the subducting Nazca plate. The Nazca plate subducts beneath the South America plate at the Peru-Chile Trench offshore of western South America, 80 km to the southwest of today’s earthquake, and dips east-northeast beneath the South American continent. At the location of the January 14, 2018 earthquake, the Nazca plate moves to the east-northeast with respect to the South America plate at a velocity of about 70 mm/yr. The location, depth and focal mechanism solution of today’s earthquake are consistent with it occurring on the megathrust interface between the two plates.

“While commonly plotted as points on maps, earthquakes of this size are more appropriately described as slip over a larger fault area. Thrust-faulting events of the size of the January 14, 2018 earthquake are typically about 50x25 km (length x width).

“The plate boundary region between the Nazca and South America plates experiences a large number of earthquakes. The region within 250 km of the epicenter of the January 14 earthquake has experienced 13 previous earthquakes of M 6.5+ over the preceding century. The largest of these, the M 8.4 earthquake of June 23, 2001, occurred along the plate boundary 130 km to the southeast (and ruptured from there ~200 km to the southeast). It resulted in at least 74 fatalities and destroyed more than 17,000 homes. The epicenter of the M 7.7 earthquake of November 12, 1996, is about 130 km to the northwest of today’s earthquake. That event ruptured much of the megathrust between its epicenter and the epicenter of the January 14, 2018 earthquake, and resulted in at least 14 fatalities and left 12,000 people homeless. The September 25, 2013, M 7.1 earthquake, just 25 km to the southeast of today’s event, is not known to have caused any fatalities.”
Modified Mercalli Intensity (MMI) Scale

More than 19 million residents were estimated to have felt levels of shaking ranging from “Weak” to “Strong” on the Modified Mercalli Intensity (MMI) scale. The areas to feel the strongest level of shaking - MMI level VI (Strong) shaking - included Acari (population: 4,000), Yauca (1,000), Lomas (1,000), and San Juan de Marcona (1,000). Areas to feel MMI Level V (Moderate) shaking included Ica (population: 247,000), Nazca (24,000), and Minas de Marcona (15,000). The USGS additionally noted that Lima (population: 7.7 million) cited MMI Level III shaking (Weak). A summary is given in the following table.

<table>
<thead>
<tr>
<th>Intensity</th>
<th>Exposed Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>II-III (Weak)</td>
<td>17.1 million</td>
</tr>
<tr>
<td>IV (Light)</td>
<td>1.6 million</td>
</tr>
<tr>
<td>V (Moderate)</td>
<td>430,000</td>
</tr>
<tr>
<td>VI (Strong)</td>
<td>7,000</td>
</tr>
<tr>
<td>VII (Very Strong)</td>
<td>0</td>
</tr>
<tr>
<td>VIII (Severe)</td>
<td>0</td>
</tr>
<tr>
<td>IX (Violent)</td>
<td>0</td>
</tr>
<tr>
<td>X (Extreme)</td>
<td>0</td>
</tr>
</tbody>
</table>

Financial Loss

The USGS Pager system, which rapidly assesses earthquake impacts by comparing the population exposed to each level of shaking intensity with models of economic losses based on past events in the relevant country or region, estimated that there was a 99 percent chance that economic losses would be less than USD1.0 million.
Natural Catastrophes: In Brief

_Cyclone Joyce (Australia)_
Cyclone Joyce made landfall over Western Australia as a tropical storm-strength system on January 12 with wind speeds of 85 kph (50 mph). The cyclone brought heavy rainfall to a large swath of the state including the city of Perth which received more than 64.4 millimeters (2.5 inches) of rain in just 12 hours on January 15 which was almost four times the long term monthly average for the entire month of January - 16.7 millimeters (0.7 inches). It was the wettest January day in Perth since 2000 and multiple roads and highways were closed due to submerged carriageways. There were no reports of any major damage though there were several instances of disruption due to flooding on roads across the state.

_Flooding (Canada)_
Portions of Atlantic Canada were hit by heavy rainfall, prompted by a strong frontal boundary, on January 13-14. Localized flooding ensued after multiple locations received 24-hour rainfall totals in excess of 100 millimeters (3.9 inches). New Brunswick and Newfoundland bore the brunt of the damage with local media noting that Kennebecasis Valley, Kings County, and Kent County were particularly adversely affected. Local reports included notable damage to infrastructure and resulting traffic disruption. About 17,500 customers were left without power due to damage to the electricity grid caused by strong winds. Rising water levels in New Brunswick prompted the temporary evacuation of approximately 100 people in Sussex while officials in Saint John County evacuated 70 residents as they feared the Musquash Dam would be breached.

_Volcano (Philippines)_
Mayon Volcano, located in the southern part of Luzon Island, Philippines began erupting on January 13 prompting the evacuation of almost 39,000 residents as the country’s chief volcanologist warned of a potentially hazardous eruption “within weeks or days”. A six-kilometer (3.7-mile) exclusion zone was put in place as the volcano emitting an ash and steam cloud that reached 2.5 kilometers (1.6 miles) high. Ash fall was recorded on the southern and southwestern slopes of the mountain and a lava flow extended some three kilometers (1.9 miles) from the crater.
This product interprets an ensemble of 40 different numerical model forecasts to produce guidance for a probabilistic prediction of the mean surface air temperatures (2 meters above the surface). Probabilities indicate the percent of ensemble members that predict temperatures significantly above normal, near normal, or significantly below normal.

Source: Climate Prediction Center
Global Precipitation Anomaly Forecast

NAEFS Raw Precip Probabilities
8-14 Day Forecast Issued 2018-01-18
Valid 2018-01-26 to 2018-02-01

This product interprets an ensemble of 40 different numerical model forecasts to produce guidance for a probabilistic prediction of accumulated precipitation. Probabilities are derived from the fraction of ensemble precipitation forecasts exceeding various thresholds.

Source: Climate Prediction Center
Weekly Sea Surface Temperature (SST) Anomalies (°C)

The SST anomalies are produced by subtracting the long-term mean SST (for that location in that time of year) from the current value. This product with a spatial resolution of 0.5 degree (50 kilometers) is based on NOAA/NESDIS’ operational daily global 5 km Geo-polar Blended Night-only SST Analysis. The analysis uses satellite data produced by AVHRR radiometer.

Select Current Global SSTs and Anomalies

<table>
<thead>
<tr>
<th>Location of Buoy</th>
<th>Temp (°C)</th>
<th>Departure from Last Year (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern Pacific Ocean (1,020 miles SW of San Salvador, El Salvador)</td>
<td>26.7</td>
<td>-0.8</td>
</tr>
<tr>
<td>Niño3.4 region (2°N latitude, 155°W longitude)</td>
<td>24.7</td>
<td>-1.0</td>
</tr>
<tr>
<td>Western Pacific Ocean (700 miles NNW of Honiara, Solomon Islands)</td>
<td>29.3</td>
<td>+0.3</td>
</tr>
</tbody>
</table>

Sources: ESRL, NOAA, NESDIS, National Data Buoy Center
El Niño-Southern Oscillation (ENSO)

La Niña conditions are currently present.

**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 standard of measure is known as the Oceanic Niño Index (ONI).
Global Tropics Outlook

*Source: Climate Prediction Center*
Current Tropical Systems

Location and Intensity Information

<table>
<thead>
<tr>
<th>Name*</th>
<th>Location</th>
<th>Winds</th>
<th>Center of Circulation</th>
<th>Motion**</th>
</tr>
</thead>
<tbody>
<tr>
<td>CY Berguitta</td>
<td>21.5S, 56.6E</td>
<td>75 mph</td>
<td>140 kilometers (85 miles) SE from Saint-Denis, Reunion</td>
<td>SW at 15 mph</td>
</tr>
</tbody>
</table>

* 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
Global Earthquake Activity ($\geq$M4.0): January 12 – 18

**Significant EQ Location and Magnitude ($\geq$M6.0) Information**

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Magnitude</th>
<th>Depth</th>
<th>Epicenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>01/14/18</td>
<td>15.776°S 74.744°W</td>
<td>7.1</td>
<td>36.3 km</td>
<td>40 kilometers (25 miles) SSW of Acari, Peru</td>
</tr>
</tbody>
</table>

Source: United States Geological Survey
U.S. Weather Threat Outlook

Potential Threats

- A series of storm systems are poised to bring heavy snowfall from the Rockies into the Upper Midwest over the weekend into early next week. Precipitation will later track into the Northeast and prompt a mixture of rain and snow. Elsewhere, Pacific storm systems will trigger heavy precipitation, high winds and large coastal waves in the Pacific Northwest.

- Gusty winds and below normal temperatures will engulf most of Alaska throughout the weekend and next week.

- Severe drought conditions persist across a growing percentage of the Desert Southwest, Rockies, Plains, Midwest and Southeast. Some precipitation is expected in some of these areas, but not enough to make a huge dent.

Source: Climate Prediction Center
Current U.S. River Flood Stage Status

Top 5 Rivers Currently Nearing or Exceeding Flood Stage

<table>
<thead>
<tr>
<th>Location</th>
<th>Flood Stage (ft)</th>
<th>Current Stage (ft)</th>
<th>% of Full Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slippery Rock Creek at Wurtemburg, Pennsylvania</td>
<td>9.00</td>
<td>22.24</td>
<td>247%</td>
</tr>
<tr>
<td>San Jacinto River near Porter, Texas</td>
<td>24.00</td>
<td>57.23</td>
<td>238%</td>
</tr>
<tr>
<td>Muskingum River at McConnelsville, Ohio</td>
<td>11.00</td>
<td>21.82</td>
<td>198%</td>
</tr>
<tr>
<td>Big Sioux River at Sioux Falls, South Dakota</td>
<td>10.00</td>
<td>17.99</td>
<td>180%</td>
</tr>
<tr>
<td>Foot Creek near Aberdeen, South Dakota</td>
<td>9.00</td>
<td>16.08</td>
<td>179%</td>
</tr>
</tbody>
</table>

Source: United States Geological Survey
Source Information

Latest winter storm brings snow/ice to the US South:
At least 8 deaths blamed on winter weather, The Associated Press
Plunging temps, hard freezes trouble Texas, Mexico vegetable growers, Southwest Farm Press
Winter storm unloads snow, ice on South, heads for Northeast, USA Today
U.S. Weather Prediction Center
U.S. National Weather Service

Windstorm Friederike causes high losses in Europe:
Storm paralyses the Netherlands. De Telegraaf
An overview of the storm damage in Flanders. Nieuwsblad
Dead and injured due to storm Friederike, Der Spiegel
Deutscher Wetterdienst

Cyclone Berguitta drenches Mauritius, La Reunion:
Multiple articles published by L'Express (Mauritius)
Multiple articles published by L'Info (La Reunion)
Joint Typhoon Warning Center
Mauritius Meteorological Service
Meteo-France (La Reunion)

Peru earthquake leaves 100+ injured:
The Latest: Peruvian quake destroys 63 homes, kills 1 man, The Associated Press
Earthquake in Peru destroys dozens of homes, kills 1 man, The Associated Press
United States Geological Survey

Natural Catastrophes: In Brief:
Perth Weather: Parts of WA Hit by 100mm of Rain as Ex-Tropical Cyclone Joyce Bears Down, The West Australian
Cyclone Joyce to Cross WA's Kimberley Coast as a Category One as Risk of Drenching Rain for Perth, ABC News (Australia)
Thousands Face Power Outages, Flooding as Heavy Rains Wallop New Brunswick, CBC News
Philippines Widens Evacuation Area as Lava Spreads Around Restive Volcano, Reuters
Australia's Bureau of Meteorology
Philippines National Disaster Risk Reduction and Management Council
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