Weekly Cat Report

April 13, 2018
This Week’s Natural Disaster Events

<table>
<thead>
<tr>
<th>Event Type</th>
<th>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</td>
<td>Asia</td>
<td>0</td>
<td>Thousands</td>
<td>1.4+ billion</td>
<td>China</td>
<td>3</td>
</tr>
<tr>
<td>Severe Weather</td>
<td>United States</td>
<td>0</td>
<td>Thousands</td>
<td>100s of Millions</td>
<td>Texas, Louisiana, Mississippi</td>
<td>4</td>
</tr>
</tbody>
</table>

Impact Forecasting will be hosting its annual roadshow in 2018. Our Impact Forecasting Revealed series looks at the strategic outcomes of modelling to help prepare you for evolving societal needs and to support customers while growing your businesses. Conferences will be held in **Bermuda** (April 24), **New York City** (April 26), **Singapore** (May 23), **Zurich** (June 4), and **London** (June 6).

Sign-up today: [http://aon.io/ifr18](http://aon.io/ifr18)

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)
Extended wintry weather leads to crop loss in China

An extended spell of wintry weather engulfed much of China from April 2-9. The period brought well below normal temperatures, accumulating snow, gusty winds, and heavy rain to the hardest-hit provincial areas of Shanxi, Shaanxi, Beijing, Shandong, Hebei, Anhui, Gansu, and Ningxia. No casualties were reported. The Ministry of Civil Affairs reported that the majority of the damage occurred to the agricultural sector, where nearly 623,900 hectares (1.54 million acres) of crops were affected. Total economic losses were estimated at CNY9.19 billion (USD1.5 billion).

Meteorological Recap

A strong cold front has caused the average temperature across China to drop by 8-14°C since April 2. The cold front interacted with warm humid winds to cause snowfall and windy weather in many parts of China. Inner Mongolia, Beijing-Tianjin-Hebei, Shanxi, and Shandong experienced maximum sustained wind-speeds between 13-31 mph (21-50 kmph) and gusts of 39-54 mph (63-87 kmph) during this time. There were reports of local snowstorms in Beijing, northern Hebei, and northern Shanxi. In Beijing, the maximum temperature dropped from 28.3 °C to 8.9 °C, with minimum temperature dropping to 0.4 °C on April 5. The cold winds and snow caused extensive damage to the region with the northwestern part of China being especially affected.

Event Details

The inclement weather has affected more than 5 million people in 9 provinces and 47 cities of China. According to local reports, over 500 houses have experienced some degree of damage. More than 600,000 hectares (1.5 million acres) of crops were affected resulting in the loss of nearly 550,000 hectares (1.35 million acres) of crops like barley, corn, potato, and tobacco. In some areas, the freezing adversely affected vineyards as well as apple and peach orchards. The following table presents the detailed loss information from the most affected regions. China’s Ministry of Civil Affairs (MCA) cited total economic losses at roughly CNY9.19 billion (USD1.46 billion). The majority of this damage cost was due to impacts to agriculture.

<table>
<thead>
<tr>
<th>Region</th>
<th>People Affected</th>
<th>Houses Damaged</th>
<th>Crop Hectares Affected</th>
<th>Economic Loss (CNY million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mentougou, Beijing</td>
<td>6,400</td>
<td></td>
<td>500</td>
<td>6</td>
</tr>
<tr>
<td>Hebei</td>
<td>78,000</td>
<td>200</td>
<td>96,500</td>
<td>1,170</td>
</tr>
<tr>
<td>Shanxi</td>
<td>956,000</td>
<td>100</td>
<td>125,400</td>
<td>2,110</td>
</tr>
<tr>
<td>Anhui</td>
<td>14,000</td>
<td></td>
<td>14,000</td>
<td>23</td>
</tr>
<tr>
<td>Shandong</td>
<td>97,000</td>
<td>100</td>
<td>5,500</td>
<td>110</td>
</tr>
<tr>
<td>Henan</td>
<td>3,300</td>
<td></td>
<td>200</td>
<td>6</td>
</tr>
<tr>
<td>Shaanxi</td>
<td>1,590,000</td>
<td></td>
<td>195,100</td>
<td>2,800</td>
</tr>
<tr>
<td>Gansu</td>
<td>2,290,000</td>
<td></td>
<td>176,300</td>
<td>2,910</td>
</tr>
<tr>
<td>Ningxia Hui</td>
<td>44,000</td>
<td></td>
<td>10,400</td>
<td>54</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5,078,700</strong></td>
<td><strong>400</strong></td>
<td><strong>623,900</strong></td>
<td><strong>9,189</strong></td>
</tr>
</tbody>
</table>
Large hail and high winds impact the U.S. South

Severe thunderstorms spawned large hail and damaging straight-line winds in parts of Texas, Louisiana, and Mississippi on April 6-7, causing significant damage in some locations. At least 15 confirmed tornadoes touched down as well in primarily rural areas. The greatest concentration of damage was noted in the greater Dallas – Fort Worth metro area in Texas, where up to baseball-sized hail pelted vehicles during rush hour traffic. Total economic and insured losses were estimated to reach into the hundreds of millions (USD).

Meteorological Recap

The inclement weather was initiated by an advancing cold front and associated surface area of low pressure tracking across the southern Plains on April 6 into early April 7. In its morning convective outlook discussion, the Storm Prediction Center (SPC) noted that very warm and moist air near a leading warm front helped initiate widespread atmospheric instability from central Texas to Louisiana. With a separate frontal boundary and energy tracking into the same region at the mid- and upper levels of the atmosphere, this helped further create conditions highly favorable for large hail, damaging straight-line winds and isolated tornado touchdowns.

As the day unfolded, numerous individual thunderstorms developed across north-central Texas and Louisiana. The most intense individual supercell storms would spawn hail larger than the size of baseballs in the greater Dallas – Fort Worth metro region, with other cells with similar hail size stretching to near the Texas/Louisiana border.

The powerful storms also spawned more than a dozen tornado touchdowns. Based on National Weather Service (NWS) assessments, there were at least 15 tornadoes – EF0 (3), EF1 (11), EF2 (1) – in Texas, Louisiana, and Mississippi. The most intense tornado was an EF2 with up to 125 mph (205 kph) winds which caused damage in DeSoto and Red River parishes. A tornado emergency was declared with that twister. Additional damage across Louisiana and Mississippi was due to straight-line winds gusting in excess of 60 mph (95 kph).

Event Details

The most significant damage during the outbreak occurred in north-central Texas, as up to baseball-sized hail was cited in parts of Collin, Denton, and Tarrant counties. The large hail shattered windows and punctured holes in the roofs of both vehicles and residential and commercial structures. Further hail damage was noted in parts of Louisiana and Mississippi as the storms tracked east-southeastward. Most wind damage was from straight-line winds across each of the three states, though some tornado damage was cited. Most of the tornadoes occurred in largely rural locations. The straight-line wind damage was primarily due to downed trees and power lines.

Total economic and insured losses were expected to reach well into the hundreds of millions (USD). Industry officials around Shreveport, Louisiana alone reported damage to at least 100,000 vehicles.
Natural Catastrophes: In Brief

**Flooding (Argentina, Chile)**
Intense thunderstorms impacted southernmost regions of Argentina and Chile on April 4-5, causing regional flooding. Rio Gallegos, the capital of Santa Cruz province in Argentina, recorded 59 millimeters (2.3 inches) of rain in a 24-hour period and this month already became the wettest April on record with 69 millimeters (2.7 inches). According to the Argentinian National Meteorological Service (SMN), the long-term average rainfall for the month of April in Rio Gallegos is 26.7 millimeters (1.1 inches), whereas the average annual precipitation is only 268 millimeters (10.6 inches). At least 50 people were evacuated and an unspecified number of homes and streets were underwater. The frontal system also brought abundant rainfall to the Chilean Magallanes region, particularly the capital, Punta Arenas.

**Flooding (Dominican Republic)**
Heavy rainfall and flooding affected the La Vega Province of Dominican Republic since April 6. Dominican Republic Emergency Operations Center (COE) declared a red alert in La Vega due to severe flooding. The provinces of Monseñor Nouel, Espaillat, and Santiago had a yellow alert declared. Over 4000 people had to be evacuated from the flooded region where 833 houses were damaged with one house completely destroyed. Damage estimate is yet to be reported by the local government.

**Earthquake (Italy)**
A relatively weak and shallow earthquake struck near Muccia in Macerata Province, Central Italy in the morning of April 10. The National Institute of Geophysics and Volcanology (INGV) registered the tremor in a depth of 9 kilometers (6 miles), with a magnitude of 4.6. The agency also suggested that the shaking was connected to an elevated seismologic activity that has been affecting the region since the major quake in August 2016. The recent tremor caused only minor structural damage, including a damaged bell tower on a 5-century-old chapel in Muccia. The event also prompted closure of regional schools and a railway line as a precautionary measure.

**Earthquake (Japan)**
On April 9, a moderate earthquake (magnitude 5.6) occurred near the city of Oda in the Shimane prefecture of Japan. The shallow earthquake (depth 8 km / 5 miles) resulted in strong ground accelerations of 0.5-0.7 g. According to reports from local media, 5 people suffered injuries and the damage was minor, including a few cracked roads. In Oda, some residents experienced power outages and disruption in water supply. Some buildings were damaged in the city and the gate to a Shinto shrine was destroyed. The nearby Shimane Nuclear Power Plant was reportedly undamaged. The economic loss from the event is expected to be minimal.

**Tropical Cyclone Keni (Fiji)**
Tropical Cyclone Keni passed Fiji as a Category 1 (Category 3 on local scale) cyclone on April 10 with peak average wind gusts of 195km/h. The worst affected region of the island of Kadavu in the eastern region, which lay directly in the path of the cyclone. Several homes were destroyed on the island, with further reports of uprooted trees and capsized boats from the southern part of Kadavu. At the time of this report, more than 6,000 people had sought shelter in evacuation centers. The full extent of the damage will be known after the National Disaster Management Office of Fiji completes the assessment in Kadavu and Ono-i-lau islands, but the most severe damage is expected to be due to flooding.

**Flooding (Indonesia)**
Flash floods and landslides occurred in West Java Province, Indonesia following heavy rainfall. In Bogor Regency, 1,781 people were affected and one person is reportedly dead. The flooding has resulted in road closures and has damaged hundreds of houses in Sukamakmur district and Cianjur Regency. The extent of damage is yet to be revealed.
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

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
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>26.6</td>
<td>-0.7</td>
</tr>
<tr>
<td>Niño3.4 region (2°N latitude, 155°W longitude)</td>
<td>25.9</td>
<td>-1.1</td>
</tr>
<tr>
<td>Western Pacific Ocean (700 miles NNW of Honiara, Solomon Islands)</td>
<td>28.7</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

<table>
<thead>
<tr>
<th>Name*</th>
<th>Location</th>
<th>Winds</th>
<th>Center of Circulation</th>
<th>Motion**</th>
</tr>
</thead>
</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 (≥M4.0):  April 6 – 12

![Map of Earthquakes](image)

### Significant EQ Location and Magnitude (≥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>04/07/18</td>
<td>5.841°S   142.490°E</td>
<td>6.3</td>
<td>10.0 km</td>
<td>88 kilometers (55 miles) WSW of Papua New Guinea</td>
</tr>
<tr>
<td>04/10/18</td>
<td>30.986°S   71.557°W</td>
<td>6.2</td>
<td>76.1 km</td>
<td>54 kilometers (34 miles) SW of Ovalle, Chile</td>
</tr>
</tbody>
</table>

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

Potential Threats

- A powerful storm system will cross the central and eastern U.S. from April 13-16, bringing a threat of widespread severe thunderstorms, heavy rainfall, and high winds. Areas from the Plains to the Northeast is expected to be impacted.

- Another bout of well below normal temperatures will engulf much of the eastern two-thirds of the country behind a strong cold front through early next week. Arctic high pressure will help keep daytime temperatures 10 to 20 degrees below normal values.

- Though not shown on the above map, the combination of high winds and dry conditions will lead to an elevated wildfire threat in the Desert Southwest and the southern Plains.

- Severe drought conditions persist for parts of the West, Rockies, Plains, and the Southeast.

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>White River at Hazleton, Indiana</td>
<td>16.00</td>
<td>26.23</td>
<td>164%</td>
</tr>
<tr>
<td>White River at Petersburg, Indiana</td>
<td>16.00</td>
<td>24.55</td>
<td>153%</td>
</tr>
<tr>
<td>Wabash River at Mr. Carmel, Indiana</td>
<td>19.00</td>
<td>28.81</td>
<td>152%</td>
</tr>
<tr>
<td>Wabash River at New Harmony, Indiana</td>
<td>15.00</td>
<td>20.67</td>
<td>138%</td>
</tr>
<tr>
<td>Wabash River at Riverton, Indiana</td>
<td>15.00</td>
<td>19.52</td>
<td>130%</td>
</tr>
</tbody>
</table>

Source: United States Geological Survey
Source Information

Extended winter weather leads to crop loss in China:
China’s Ministry of Civil Affairs

Large hail and high winds impact the U.S. South:
Severe sloppy weather slams South, West with more in store on Saturday, USA Today
North Texans clean up after severe storms on Friday night, NBC5 Dallas-Fort Worth
Tornado damages homes in St. James parish, The Times-Picayune
Friday storm caused damage to at least 100,000 vehicles, KSLA TV
U.S. National Weather Service
U.S. Storm Prediction Center

Natural Catastrophes: In Brief:
Strong storms in Río Gallegos: it rained three times the April average. La Nacion
Strong frontal system affects Punta Arenas. CNN Chile
Marche earthquake, shock of 4.6 between Ancona and Macerata: "Damage, closed schools". Corriere della Sera
M6.1 quake hits western Japan’s Shimane, 5 injured. The Mainichi
Fiji’s NDMO to assess damage from Cyclone Keni. RadioNZ
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