

H1 2023

Natural Catastrophe Report

Preliminary Overview

JULY 2023



Gallagher Re

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GLOBAL OVERVIEW

US Thunderstorms and Global Impacts from El Niño's Arrival Drive Above-Average H1 Natural Catastrophe Insured Losses.

Preliminary H1 Global Loss Totals: Economic (USD138 billion) and Insured (USD52 billion) show continued growth.

The first six months of 2023 featured above average natural catastrophe losses as NOAA declared the official arrival of El Niño¹ which was poised to bring further influence on global weather/climate events through the end of the year. Total direct economic losses from natural hazards were preliminarily estimated at USD138B. The cost covered by private insurance or public insurance entities tallied USD52B. This marked a protection gap of 63% (USD86B). The H1 totals for solely weather/climate events (excluding earthquakes or other non-atmospheric-driven perils) were USD92B (economic) and USD46B (insured). These totals, which may be rounded in some cases, are subject to change as loss development occurs and new data is obtained in the weeks and months ahead.

The severe convective storm (SCS) peril was highly dominant for the insurance industry in H1 2023. A very active multi-month pattern spawned a prolific series of outbreaks across the US that led to a minimum of USD34B in insured losses. This represented 65% of all global H1 insured losses. At least 812 confirmed tornadoes touched down, though hail was the dominant damage cost driver with NOAA's Storm Prediction Center (SPC) recording at least 729 individual instances of hail larger than 2.0 inches (5.1 centimeters) in diameter striking US communities. For all perils, the US accounted for 76% of global insured losses; but just 38% of global economic losses. Thunderstorms in Europe during June brought a billion-dollar insurance bill to parts of Germany and France.

Other parts of the world also experienced significant natural hazard activity. The confirmed death toll from the February sequence of historic earthquakes in Turkey and subsequent impacts in Syria rose above 59,250 as the insured cost topped USD5B. New Zealand continued to count the cost of its two costliest weather events on record—that occurred in a matter of weeks' time in January and February—which led to at least USD2.3B in combined insured losses. Italy's Emilia-Romagna region saw record-setting rainfall in May that left a minimum direct economic toll of USD9.7B. Anomalously warm conditions fueled by an influence from the transition to El Niño and the influence of climate change aided in the ignition of catastrophic wildfires in Canada, amplified severe drought conditions in South America, Europe, and Asia, and heatwaves left hundreds of people dead in parts of North America and Asia. Heavy precipitation from the seasonal monsoon and the remnants of Cyclone Freddy left more than 2,500 people dead in Africa.

¹ El Niño is broadly monitored by tracking sea surface temperature anomalies in the central and eastern Pacific Ocean. However, climatic effects usually do not become immediately apparent as there can be a delayed response in interaction between the atmosphere and oceans. These interpretations lead to different agencies using different criteria to define ENSO phases.

*Note: All loss totals in this document are adjusted to 2023 USD unless explicitly stated otherwise. Totals were adjusted using the US Consumer Price Index and a construction index factor.

Global Natural Hazard: Notable Statistics in H1 2023

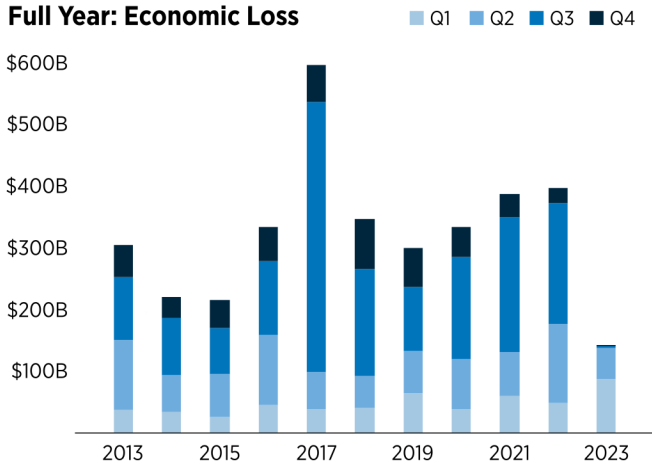


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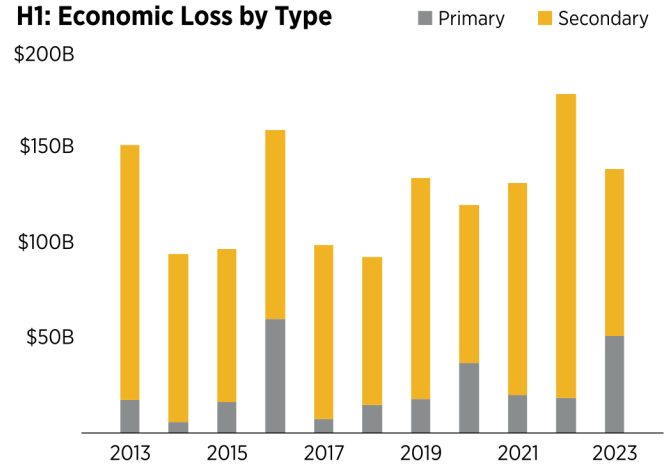
Economic Loss

The total H1 economic loss was 11% higher than the decadal average (2013-2022) and 7% higher than 21st Century average (USD126B and USD131B, respectively). The costs were driven by the February earthquake sequence in Turkey (USD45B), a highly active US severe weather season (>USD44B), and notable implications from global flooding and drought as influences from the transitional phase to El Niño conditions became more pronounced. The earthquake and SCS perils alone accounted for nearly 70% of economic losses. Secondary perils—which exclude the defined primary perils: tropical cyclone, earthquake and European windstorm—accounted for 63% (USD87B) of the total. There were at least 25 natural catastrophe events which topped USD1B in direct economic damage, including 16 alone in the US. 24 of the events were weather/climate related.

Full Year: Economic Loss

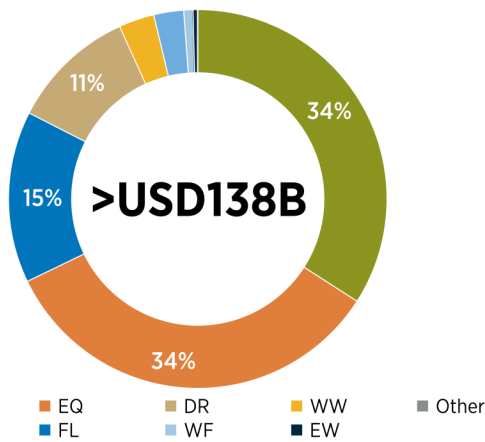


H1: Economic Loss by Type



Loss totals adjusted to 2023 USD using the US Consumer Price Index and a construction index factor

H1: Economic Loss by Peril



EQ: Earthquake SCS: Severe Convective Storm TC: Tropical Cyclone
 WW: Winter Weather DR: Drought EW: European Windstorm
 WF: Wildfire FL: Flooding

H1: Economic Billion-Dollar Events

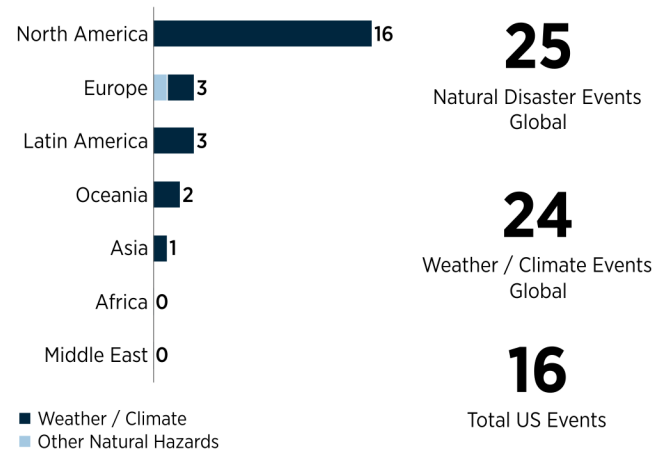
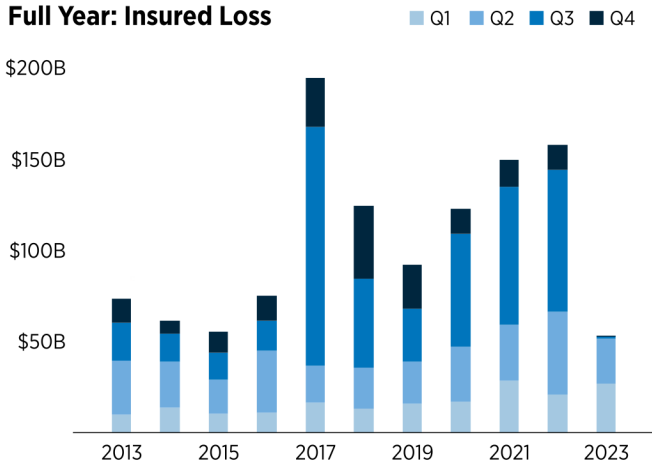


Figure 1: H1 global economic loss statistics. | Data and Graphic: Arthur J. Gallagher & Co.

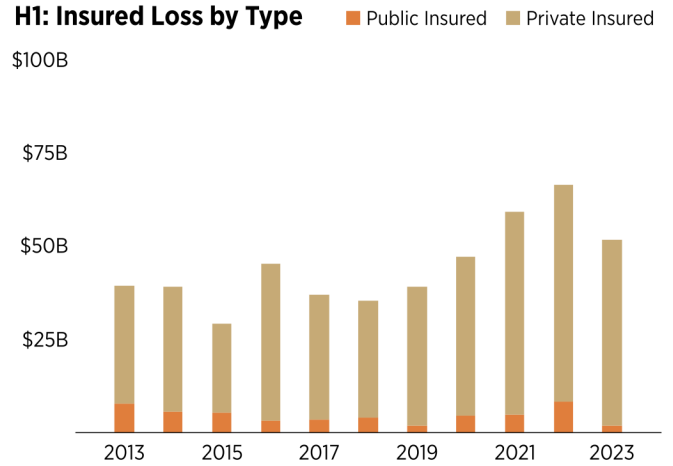
Insured Loss

The total H1 insured loss was 18% higher than the decadal average (USD44B) and 39% above the 21st Century average (USD38B). The SCS peril dominated insurance industry payouts, with the total (USD35B) representing 69% of natural hazard-related claims payouts. The US minimally incurred its second costliest H1 for the SCS peril on record. Other countries set new individual records for weather events. New Zealand recorded its two costliest weather events in January and February following torrential rains and the remnants of Cyclone Gabrielle. The combined cost was minimally estimated at USD2.3B. Italy's Emilia-Romagna region endured prolific rains that led to extensive flooding and an expected insured loss tally minimally into the hundreds of millions (USD) which could set a record for a weather event in the country's history. There were at least 17 natural catastrophe events which topped USD1B in insurance payments, including 13 alone in the US. 16 events were weather/climate related.

Full Year: Insured Loss

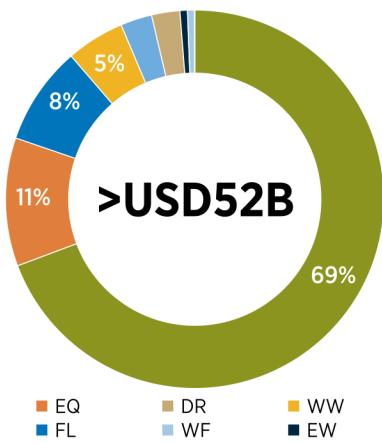


H1: Insured Loss by Type



Loss totals adjusted to 2023 USD using the US Consumer Price Index and a construction index factor

H1: Insured Loss by Peril



EQ: Earthquake SCS: Severe Convective Storm TC: Tropical Cyclone
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H1: Insured Billion-Dollar Events

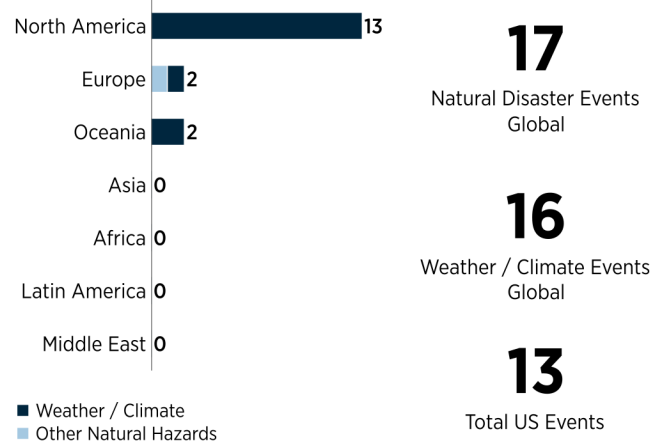
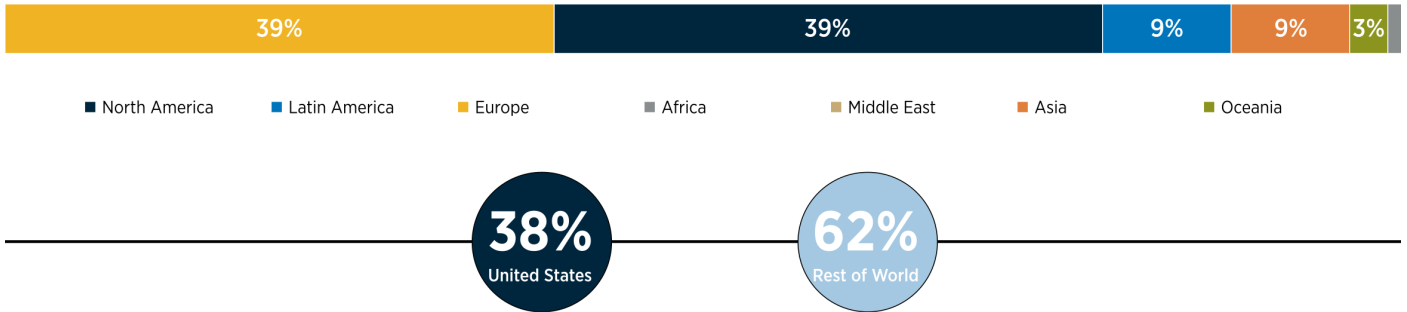


Figure 2: H1 global insured loss statistics. | Data and Graphic: Arthur J. Gallagher & Co.

Europe accounted for 39% of the economic loss, which was dominated by the February earthquake sequence in Turkey that had devastating regional impacts. North America, mainly from events in the US, also registered 39%. Insured costs were overwhelmingly dominated by North American events. The US alone accounted for more than three quarters (76%) of all insured natural hazard related-losses during the first six months of 2023.

Economic



Insured

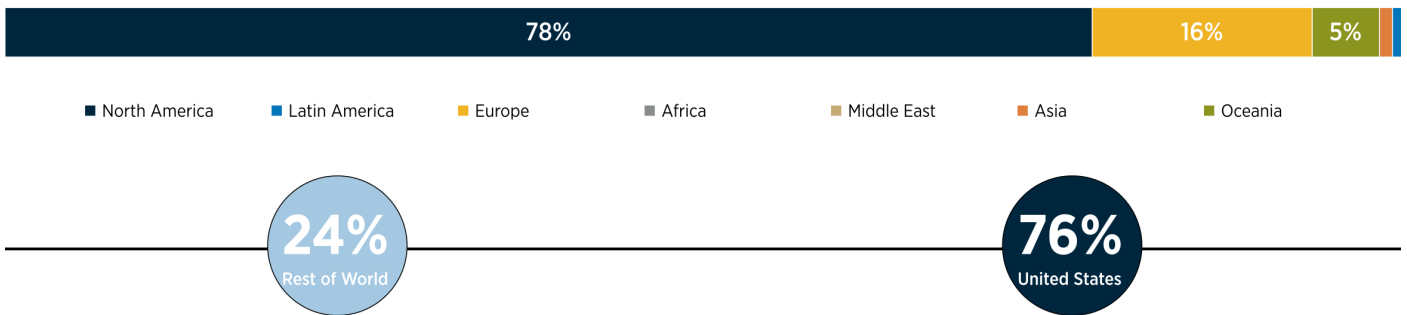


Figure 3: H1 2023 economic (top) and insured (bottom) loss total percentages by region. | Data and Graphic: Arthur J. Gallagher & Co.

**CONVERSATION
STARTERS: H1 2023**

Conversation Starters: H1 2023

State of the Insurance Market as the Peak of Tropical Cyclone Season Approaches

The last six Atlantic hurricane seasons brought insurance carriers notable upward pressure on the cost of purchasing reinsurance cover. With the peak of the 2023 Atlantic hurricane season fast approaching, plus the likelihood of heightened tropical cyclone activity in the Pacific Ocean given the arrival of El Niño, the focus has again shifted to industry readiness in the face of additional costly storms. Sea surface temperatures remain at seasonally record warm levels globally and especially in the North Atlantic. Scientific research consensus has concluded that warmer ocean waters lead to increased potential of more intense tropical cyclone behavior.

The reinsurance industry remains amid a hardened market mid-year renewal cycles ended and were marked by notable rate increases ranging from 25% to 40%. However, it should be noted that the earlier start on renewals, combined with well-defined appetites from reinsurers, a modest increase in insurance-linked securities (ILS) capital and favorable Hurricane Ian loss development that remained on the lower end of vendor model estimates allowed the mid-year renewals to be a bit more orderly compared to January 1. The risk spread of Cat bond placements remained elevated year-over-year for all perils, but still notably lower than Q4 2022. Insurers were able to locate ample available capacity though there were still no obvious signs of fresh reinsurance capital entering the market. There was a continuation of a shift in capacity migrating to higher layers, though this was offset by some reinsurers building further support across the entirety of their placements to guarantee capacity.

A topic of growing importance centered on insurability as the influence of climate change becomes more evident. The first six months of 2023 saw additional large US insurance carriers announce the stoppage of new homeowner policies in states such as California and Florida, as well as more broadly across the country, or pulling out of some markets entirely. The deterioration of loss ratios due to heightened claims payments from natural catastrophes in recent years has put much more pressure on underwriters to identify and produce actuarially sound premium intake to meet the reality of rising loss costs.

The Florida insurance market continued to see premium price hikes and as a result, the state-run Citizens Insurance – the insurer of last resort – further added nearly 150,000 new policies during the first six months of 2023 alone. However, there were some signs of market stabilization as a few private carriers in June announced they would add policies from Citizens into their portfolios. The industry is monitoring whether legislative reforms passed in December 2022 will help bring more market stability. While there has been a marked reduction in claims litigation cases since passage, it remains too soon to determine whether the reforms will be enough to entice an influx of private insurance carriers back into the state.

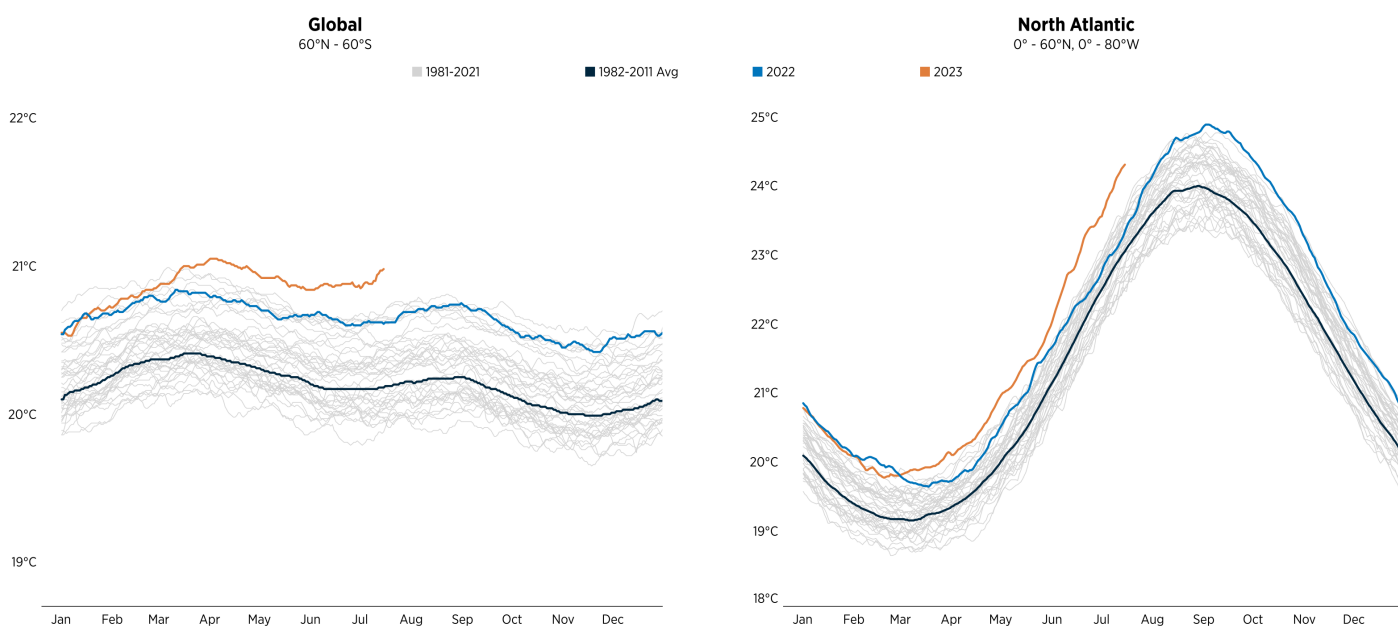


Figure 4: Sea surface temperatures in the world's oceans, including the North Atlantic, remain at record YTD warm levels (since 1981) as peak tropical cyclone season looms.

Data: NOAA | **Graphic:** Arthur J. Gallagher & Co.

Members Depart the UN’s Net-Zero Insurance Alliance (NZIA); Sustainability Commitments Remain Firm

The Net-Zero Insurance Alliance (NZIA) saw more than half of its members exit the United Nations-sponsored initiative during the first half of 2023. The departures included some of the founding members of the alliance, which called into question the viability of the NZIA moving forward. A portion of the exiting reinsurers and insurers cited the increasingly difficult prospect of antitrust concerns emanating from several state attorney generals in the US.

Numerous departing members have also shifted attention towards the development of their own tools and methodologies to quantify the carbon emissions in their portfolios. Such tools are critical as companies seek to decarbonize while planning near- and long-term underwriting strategies and in their efforts to achieve publicly declared net-zero emission targets.

As time progresses it is entirely probable that the central focus within the industry will be on potentially divergent methodologies being used by companies to achieve their net-zero targets. The NZIA principally used a methodology created by the Partnership for Carbon Accounting Financials (PCAF). Despite initially agreeing to the PCAF methodology, some departing NZIA members have since called into question the calculating formula, while others pledged to continuing to foundationally use PCAF while making their own bespoke tweaks.

Should a high number of insurers and reinsurers move forward with the development of their own decarbonization accounting practices, the challenge for the industry moving forward will be trying to equally compare companies with different methodologies. There would be no standardized and universally agreed-upon approach, which would make it nearly impossible to benchmark progress among various re/insurers. This would be a particularly problematic when trying to quantify Scope 3 (indirect) emissions and would likely require a “clear box” transparency approach in making methodology documentation an essential exercise.

An announcement by NZIA in July 2023 declared: “Going forward, NZIA member companies have no obligation to set or publish targets: rather, individual member companies will be responsible and publicly accountable for any targets they set, the methodologies used to set them, the timeline on which they decide to publish any targets, and the progress they are making. As before, NZIA members who publish their own decarbonization targets and timelines do so unilaterally and independently.”

Despite the uncertainties surrounding NZIA’s continued influence and potential issues around methodology accounting, there remains near-unanimous agreement that companies remain firmly committed to their sustainability pledges. With some companies pledging to reach certain net-zero commitments by 2030, and others by 2050, time is nearing for clear progress to be seen and measured. There are real headwinds facing the industry as it navigates an evolving regulatory environment and the broader issue of insurability in some parts of the world. The expectation is that the industry will only accelerate its investment into climate and environmental, social, and governance (ESG) topics to better prepare for a riskier world.

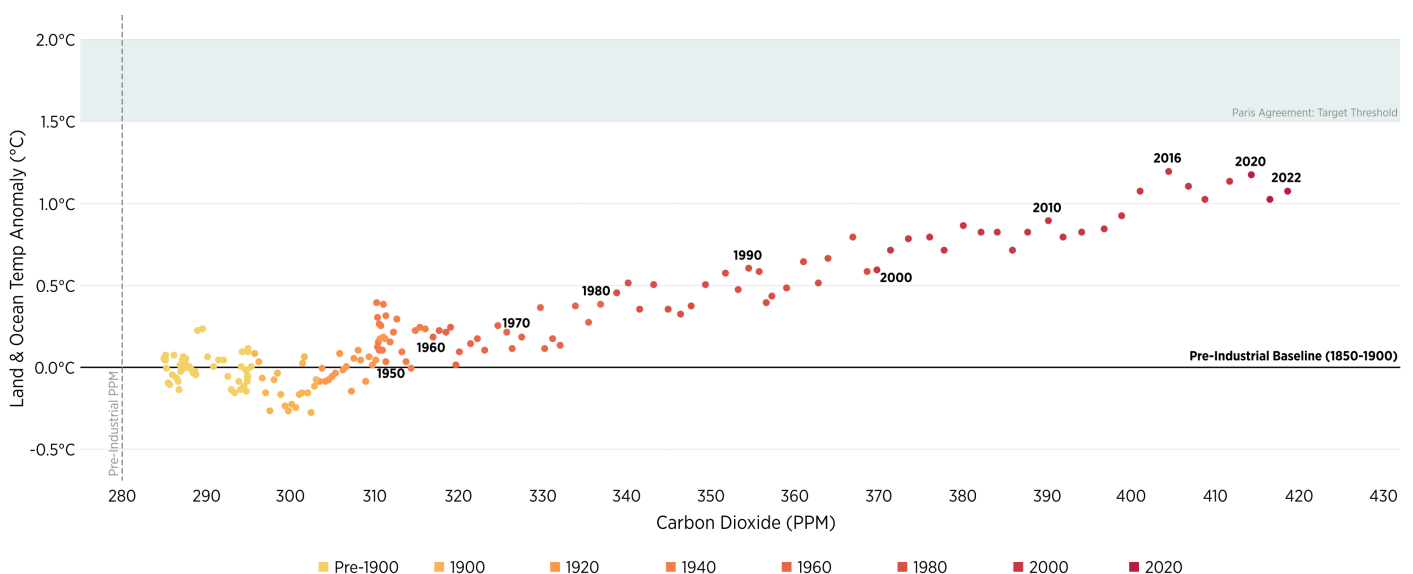


Figure 5: Global annual average carbon dioxide (CO²) concentrations correlated to annual land/ocean temperature anomalies (1850-2022) vs the pre-industrial baseline. **Data:** NOAA | **Graphic:** Arthur J. Gallagher & Co.

WEATHER / CLIMATE REVIEW

Weather/Climate Review

Global Heat Records and Sea Ice Minimums Observed as NOAA Confirms Arrival of El Niño

The first six months of 2023 ranked as the 3rd warmest since 1850, per NOAA. The anomalies are compared to the 20th Century and Pre-Industrial Era land and ocean temperature baseline. The northern hemisphere was dominated by instances of extreme heat during HI, with above normal temperatures registered in most continental areas. June was noted as the warmest June ever recorded, and marked the 532nd consecutive month with temperatures nominally above the long-term average. The heat continued into the start of Q3, with the first week of July officially deemed the hottest week in recorded history. With the World Meteorological Organization and NOAA each confirming the arrival of El Niño, it raises the potential of 2023 ending as one of the warmest years ever officially recorded. Global temperatures tend to be warmer during El Niño phases, and continued warming that can be directly attributed to anthropogenic fueled climate change only amplifies the effects that El Niño has on the earth's environment.

NOAA cited that there was a 20.2% chance that 2023 will eventually end as the warmest year on record dating to 1850, and a 97.1% chance of ranking in the top five. Through the first six months of 2023, some of the most anomalously warm parts of the world were found in the Americas. Parts of Canada and Latin America were particularly affected. Elsewhere, large swaths of Europe, Africa and Asia were notably warmer than normal. Conversely, parts of the US West, India and Australia showed slightly below normal temperature anomalies. As El Niño becomes further established, and likely follows patterns of historical El Niño phases, it was expected that the expanse of warm areas will continue to increase in spatial coverage through the rest of 2023.

Rank	Year	20th Century Baseline	Pre-industrial Baseline
1	2016	+1.14°C/2.05°F	+1.32°C / 2.38°F
2	2020	+1.09°C/1.96°F	+1.26°C/2.27°F
3	2023	+1.01°C/1.82°F	+1.19°C/2.14°F
4	2017	+0.99°C/1.78°F	+1.17°C/2.1°F
5	2019	+0.97°C/1.75°F	+1.14°C/2.05°F
6	2022	+0.93°C/1.67°F	+1.1°C/1.98°F
7	2015	+0.86°C/1.55°F	+1.03°C/1.86°F
8	2018	+0.85°C/1.53°F	+1.02°C/1.84°F
9	2010	+0.81°C/1.46°F	+0.98°C/1.76°F
10	2021	+0.80°C/1.44°F	+0.98°C/1.76°F

Table 1: NOAA temperature anomalies for HI showing 20th Century (1901-2000) and Pre-Industrial (1850-1900) baselines for comparison.

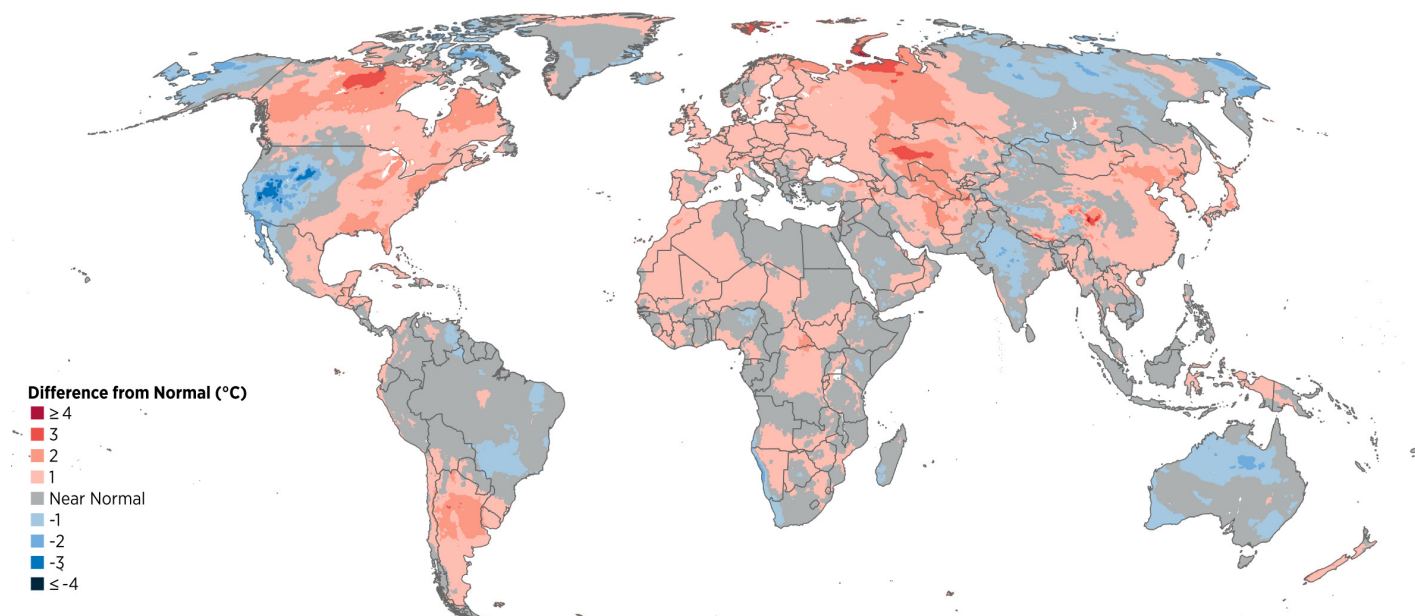


Figure 6: HI global temperature anomalies compared to the 1991-2020 climatological normal. | **Data:** Copernicus (ERA5) | **Graphic:** Arthur J. Gallagher & Co.

The warmth of the world's oceans was notable as the peak of tropical cyclone season arrives during Q3 into Q4. As mentioned, the arrival of El Niño typically corresponds to reduced North Atlantic tropical cyclone activity and higher frequency in the Eastern and Western Pacific. However, to date, the North Atlantic has instead been fueled by record-setting warmth, lower atmospheric pressure, less wind shear, and overall conditions that have similarities to analog years that favor an above-average season. It would be exceedingly rare to witness higher than normal tropical cyclone seasons in both the North Atlantic and Pacific Ocean basins, but 2023 could potentially prove itself anomalous if current trends persist. While there is typically an outsized focus on the frequency of events, it is essential to remember that a singular landfalling event can entirely alter the impacts felt by the insurance industry.

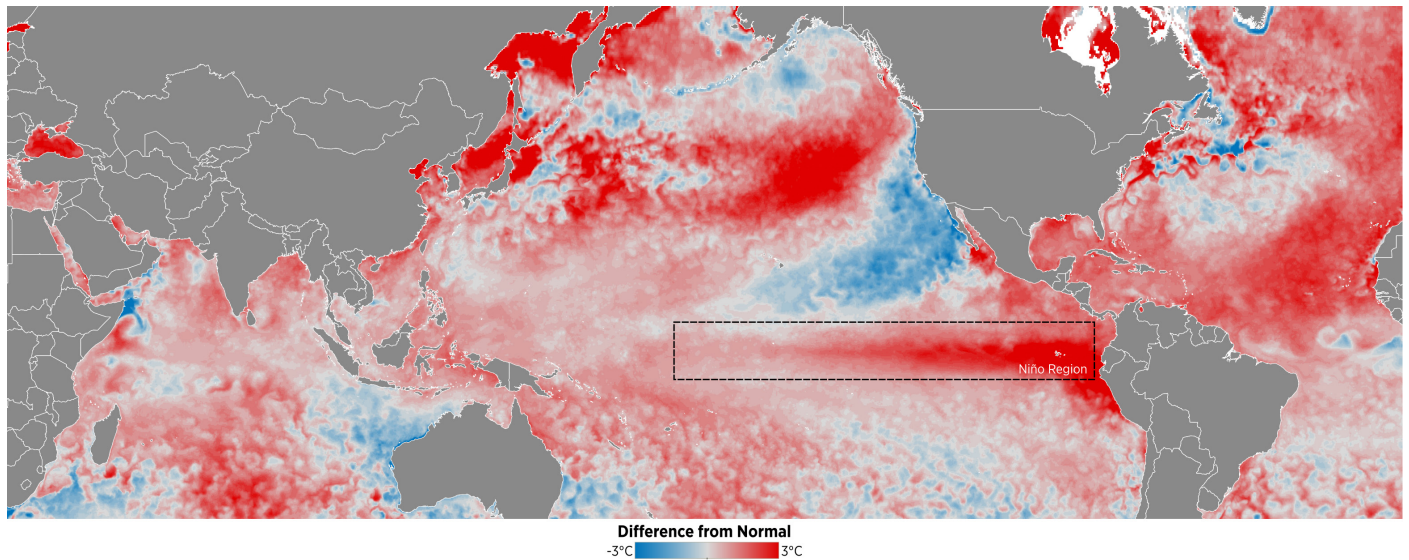


Figure 7: Sea surface temperature anomalies on July 1, 2023 showing deepening El Niño conditions in the Pacific Ocean and abnormally warm waters in the Atlantic Ocean.
Data: NOAA | **Graphic:** Arthur J. Gallagher & Co.

When looking solely at air temperatures, the month of June into the first half of July 2023 featured record-setting warmth. While official observed data records only exist back to 1979, paleoclimatologists have concluded that the daily global temperature averages topping 17.0°C (62.6°F) are plausibly the warmest recorded on the planet in 100,000 to 125,000 years. The typical expected warming via a moderate-to-strong El Niño plus the influence from climate change has amplified warming on the planet, which is consistent with scientific research. While temperatures may have been this warm 125,000 years ago, the rise to reach such levels occurred more gradually within a temporal scale in the thousands of years; not the much more accelerated rate seen today across decades.

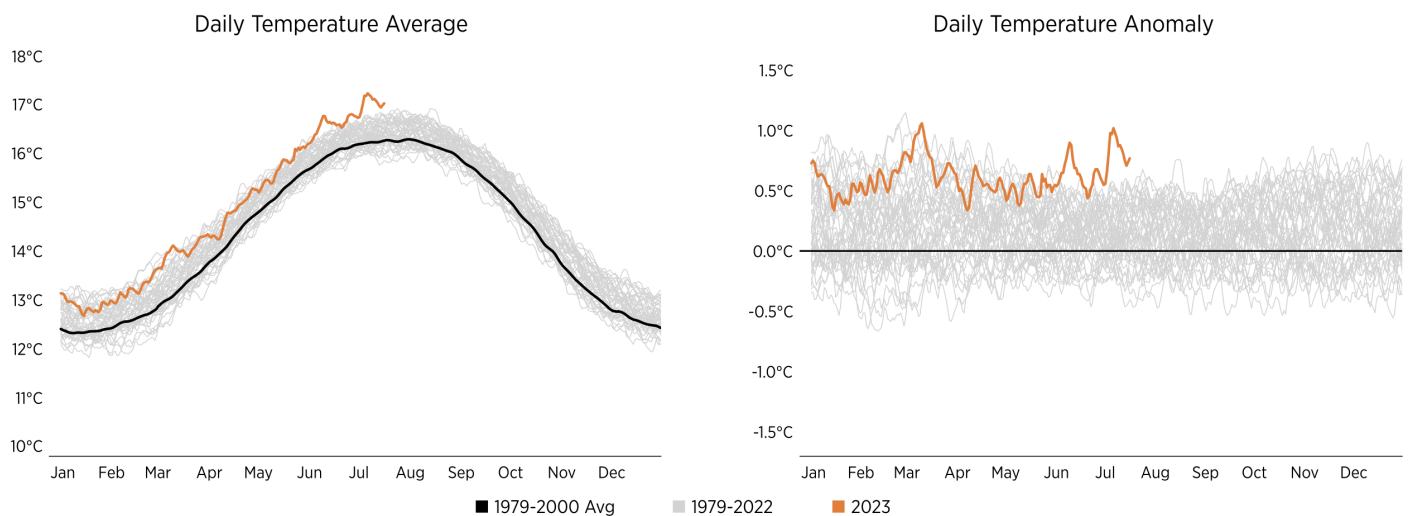


Figure 8: Global daily temperature average and temperature anomalies (1979-Present) which show 2023 as setting several new daily modern day records for warmth.
Data: NOAA | **Graphic:** Arthur J. Gallagher & Co.

The anomalous land and ocean warmth continued to play a significant role on sea ice extents. During peak boreal (Northern Hemisphere) winter, the maximum sea ice extent in the Arctic was 14.65 million km², the fifth lowest on record dating to 1978. The five lowest maximum sea ice extents have occurred since 2015. The declining minimum trend was even more stark in the Antarctic, where a record sea ice minimum of 1.77 million km² was recorded on February 19 during peak austral (Southern Hemisphere) summer. While the record low was partly driven by a positive southern annular mode, it is noteworthy that the ice sheets were mostly at anomalous record lows for a majority of HI. There were concerns such change could be indicative of reaching a climate tipping point and be an irreversible shift. Polar ice meltwater and subsequent thermal expansion can accelerate coastal sea level rise.

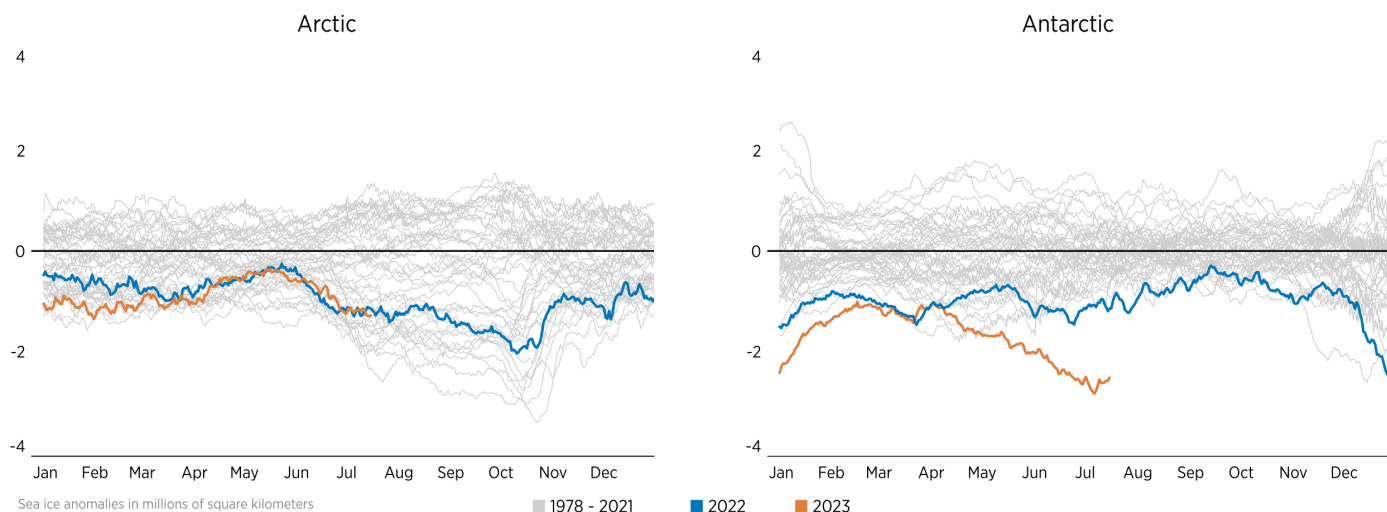


Figure 9: Anomalously warm ocean and air temperatures have led to record low sea ice anomalies (square kilometers) in the Arctic and Antarctic during HI 2023. **Data:** NOAA | **Graphic:** Arthur J. Gallagher & Co.

There were distinct differences in HI precipitation anomalies around the world, which is to be expected. Parts of south and east-central Africa were affected by frequent bouts of flooding due to above-average seasonal rainfall and the lingering remnants of Cyclone Freddy in February and March. A series of atmospheric rivers brought considerable inundation into the US state of California in Q1. In other parts of the world, including Mexico, Argentina, Spain and Portugal, it was anomalously dry. Much of Asia showed signs of a transition to an El Niño-like pattern, with a late onset of the summer monsoon and plum rain seasons.

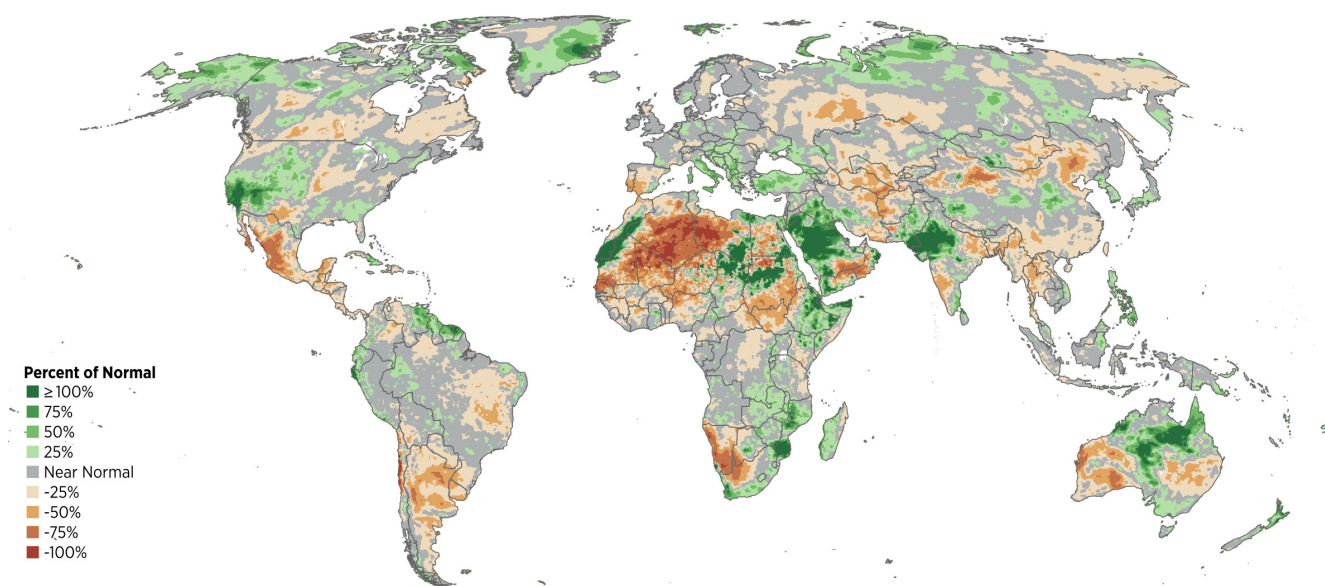


Figure 10: HI global precipitation anomalies compared to the 1991-2020 climatological normal. | **Data:** Copernicus (ERA5) | **Graphic:** Arthur J. Gallagher & Co.

MAJOR EVENT REVIEW

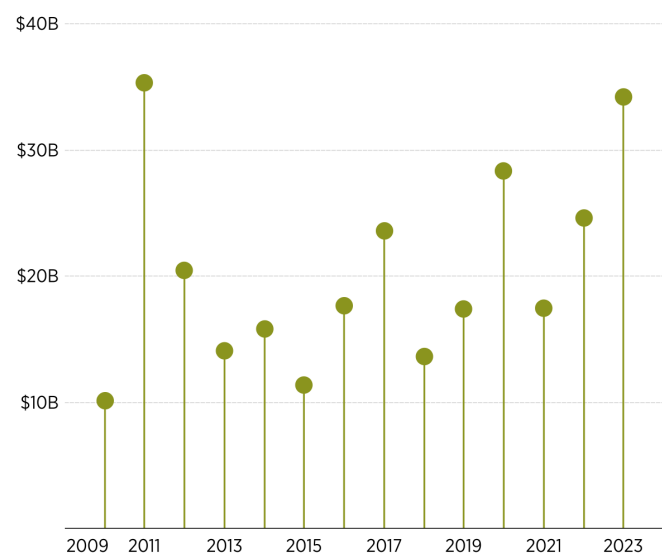
Major Event Review

US: Severe Convective Storms

US severe convective storm (SCS) insured losses in H1 2023 exceeded USD34 billion. Here are some statistics to put the H1 financial toll of US SCS into perspective:

- Second costliest H1 on record for insured US SCS losses; currently behind 2011 (USD36B), but likely to surpass.
- 2023 already sits as the third-costliest year on record for US SCS; only behind 2020 (USD44B) and 2011 (USD40B).
- 2023 marks the 16th consecutive year with insured US SCS losses topping USD10B.
- At least 14 individual billion-dollar economic loss US thunderstorm events; at least eight were multi-billion-dollar events.
- 2023 has set a record with at least seven multi-billion-dollar insured loss events; surpassing the five in 2011 and 2020.

H1: US SCS Insured Loss



Full Year: SCS Insured Loss

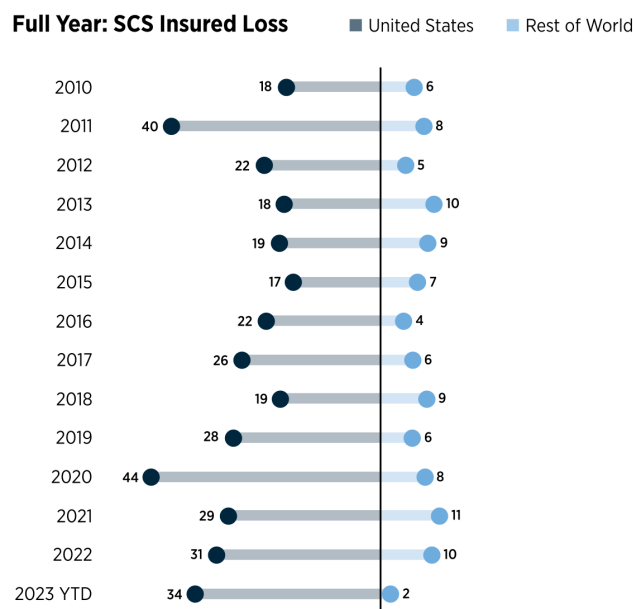


Figure 11: Insured costs from US severe convective storms are off to a near-record pace in H1 2023 (left) and continue to dominate global insured SCS totals (right).

Data and Graphic: Arthur J. Gallagher & Co.

In Q1, losses were led by notable outbreaks in March. These included a record spring low-pressure system in early March that resulted in a multi-billion-dollar loss for the insurance industry in Texas and Kentucky combined. The quarter ended with the March 31-April 1 tornado outbreak that generated 145 confirmed tornadoes. This ranked third worldwide for the most confirmed tornadoes in a 24-hour period, surpassed by the 1974 and 2011 US Super Outbreaks.

Hail and wind related hazards drove most losses in Q2. During mid-June, a seasonally anomalous jet-stream in tandem with strong diurnal heating and moisture from the Gulf of Mexico aided in daily occurrences of damaging SCS across the plains, Lower Mississippi Valley, and southeast. This included hundreds of instances of very large hail (2.0+ in / 5.1+ cm). Significant losses were incurred in densely populated regions near the Dallas-Fort Worth metroplex in Texas and Hot Springs in Arkansas among other locations.

In June alone, there were at least 349 reports of hail reaching and exceeding 2.0+ in (5.1+ cm) across the US and 89 reports of hail 3.0+ in (7.6+ cm) or larger. These counts both set a record for any month in recent history beating the previous highs of 316 and 61 respectively which were set in May 2011. During the month, hail which approached or exceeded 4.0 in (10.2 cm), the size of a softball, pelted localities in at least ten states.

Hail has historically been a main driver of SCS losses on an annual basis in the US, particularly to the agriculture, residential and automotive lines of business. Expanding urban footprints in hail prone regions, in tandem with the increasing cost and size of homes has further enhanced hail related claims in recent years.

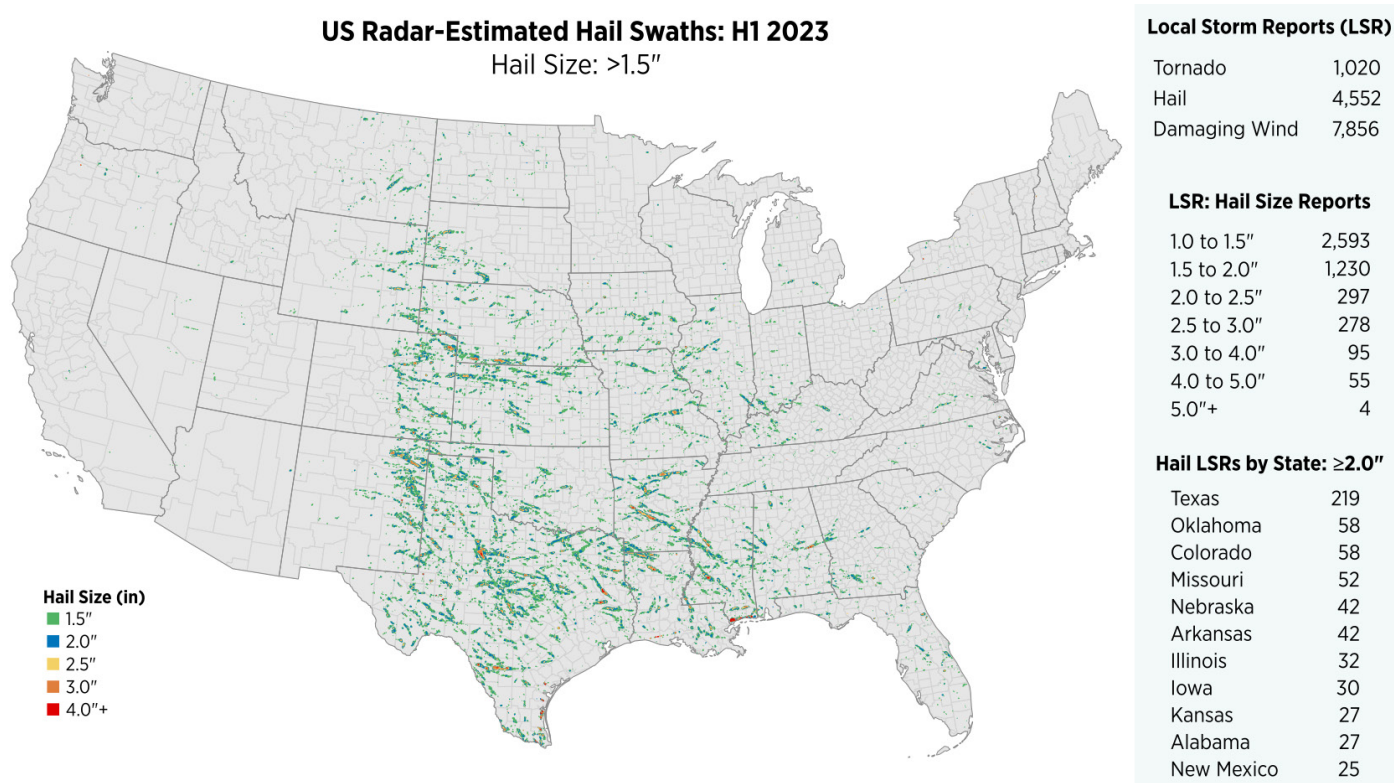


Figure 12: Combined large hail swaths across the United States in H1 2023. | **Data:** NOAA | **Graphic:** Arthur J. Gallagher & Co.

At least 74 people were killed by tornadoes in the US in H1, led by March twisters which accounted for 47 tornado related fatalities. As of this publication, the SPC and National Weather Service (NWS) offices had confirmed at least 812 tornado touchdowns in H1 (1,020 were unofficially reported). This included 27 rated at either EF3 (25) or EF4 (2) intensity, which marks the highest annual total of EF3+ twisters since 2019 (36). Both EF4 tornadoes touched down in March in Mississippi and Iowa. While there has not been a significant trend in the long-term annual number of tornadoes reported across the US, data has shown a regional increase in tornado frequency across the vulnerable southeastern states in recent years.

What It Means: The insured costs associated with the US thunderstorm peril have shown a 4% annual growth rate above inflation during the past 15 years. While there remains uncertainty regarding the scientific reasoning for such loss acceleration—most research suggests an easterly and southerly shift in storm activity—the obvious driving factors involve expanding population centers within known high-risk SCS areas of the US. The insurance industry is in a unique position to work with their clients to better educate and/or incentivize opportunities to limit risk through greater event awareness or retrofitting roofs with more storm-resistant materials. With annual insured SCS losses now regularly topping USD25B, this is a peril causing large hurricane-level aggregated losses on a consistent basis and requires a new level of industry, government and academic focus.

Italy: Flooding

Prolific rains in northern Italy’s Emilia-Romagna region in mid-May led to extensive flooding and an expected insured loss tally minimally near USD500M, which would mark one of the most expensive for weather events in the country’s history. Provincial government agencies estimated that direct economic impacts were at least EUR8.8B (USD9.7B). The event resulted in 15 fatalities.

The most notable rainfall was recorded from May 15-17 and was associated with an area of low pressure named Minerva that deluged parts of eastern Emilia-Romagna. This followed days after previous flooding damaged similar regions in early-May. The most impacted provinces included Bologna, Ferrara, Forli-Cesena, Ravenna, and Rimini. The highest rainfall accumulations during the first 18 days of the month were measured at stations in the Apennine Mountains, where totals approached and exceeded 400 to 500 mm (15.7 to 19.7 in). In the hardest-hit localities, this represented 50% or greater of the average annual rainfall. Numerous rainfall records were broken, and more than 1,000 landslides were recorded.

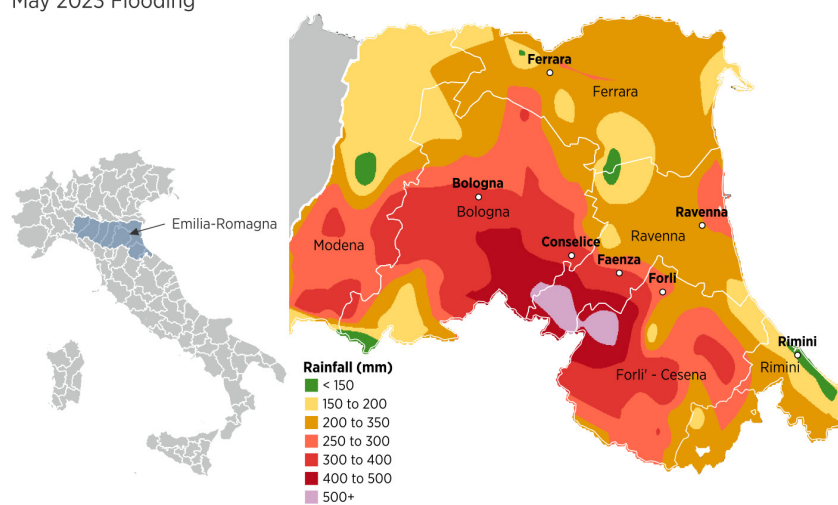
Significant damage was incurred to homes, infrastructure and agriculture. Government officials initially estimated repairs to ecological system and public infrastructure alone would exceed USD4.5B. Further economic losses to private homes, businesses and the agricultural sector were each individually expected to be in the billions (USD). Estimates in mid-June indicated more than 70,000 homes and 21,000 farms were impacted by flooding and/or landslides in Emilia-Romagna. Nearly 42% of the utilized agricultural land in the region was affected.

While low-lying lands in Emilia-Romagna have been historically prone to flooding, the May 2023 event was further exacerbated by prolonged and multi-year drought which gripped Italy in the months prior. Severe climate driven drought conditions enhanced the risk for flooding by reducing the capacity of the soils to absorb water and concurrently increased runoff.

Western and Central Europe have been particularly prone to extreme rainfall events in recent years. In 2021, Storm Bernd resulted in unprecedented flooding, predominantly in Germany and Belgium, resulting in the largest natural catastrophe-related industry loss for Europe on record (USD16B).

Italy: Emilia-Romagna
May 2023 Flooding

Station Interpolated Rainfall: May 1 - 18, 2023



Copernicus: Satellite-Estimated Flood Footprint in Forli Region

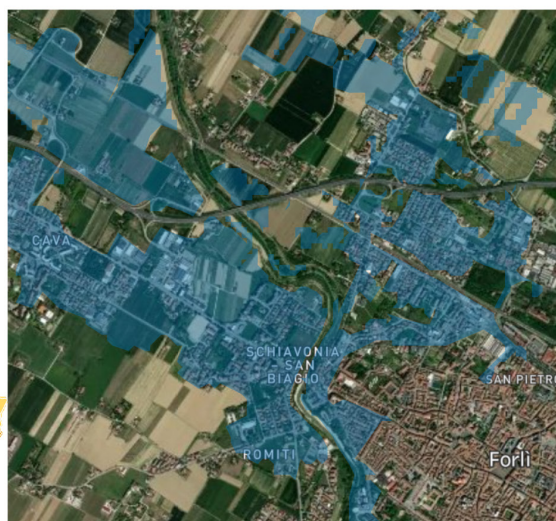


Figure 13: Station interpolated precipitation (mm) and estimated satellite derived flooding footprint.
Data: ARPAE Emilia-Romagna, Copernicus | Graphic: Arthur J. Gallagher & Co.

What It Means: The catastrophic floods across Emilia-Romagna showcased the significant protection gap that continues to exist within the Italian insurance market. While the floods resulted in claims payouts anticipated to approach or exceed USD500M and becoming one of the country’s costliest weather-related disasters on record, most of the damage was left uninsured. With climate risk growing more evident, the growth of high-impact events is showcasing the major vulnerabilities that exist in aging current infrastructure—even in developed territories. Studies continue to indicate that trillions of dollars (USD) of global infrastructure investment will be required to be ably prepared to face the climate of the rest of the 21st Century and beyond.

Global: Wildfires/Drought

Drought

South America: Historic and multi-year drought and heatwaves continued to impact regions of southern Brazil, Uruguay and Argentina, particularly the La Plata Basin in H1. An escalating water crisis in Uruguay resulted in a state of emergency declaration in late-June for the capital Montevideo. Estimates from Argentina and Brazil projected H1 economic drought losses in each country to have approached USD5B. Most of the losses were incurred to the agricultural, livestock and transportation sectors. Soybean production in Argentina alone was projected to be 44% lower than normal in 2023. Uruguay anticipated drought losses from the 2022/23 seasons combined to reach into the billions (USD), and rank among the worst in the country’s history. By the end of H1, gradual relief in some affected areas had been noted, aided by increased rainfall resulting from the transition to El Niño conditions.

North America: Major drought conditions were found across large swaths of Canada, Mexico, and parts of the central and eastern US. The dry and hot weather aided in historic wildfires in Canada, while causing major disruption to crop productivity in the Canadian Prairies. A prolonged series of atmospheric river events in late 2022 and early 2023 significantly alleviated drought conditions across the western US though the peak of the dry season in Q3/Q4 could bring a return to drier weather.

Europe: Spain and Portugal grappled with severe drought conditions. Both had their driest and third driest April. The European Drought Observatory (EDO) placed widespread warning and alert conditions in these two countries. Severe vegetation stress was observed across the Iberian Peninsula. The Spanish Agricultural Union (SAU) reported 5 million hectares (12.3 million acres) loss of crops.

Asia: Severe drought impacted Yunnan, China in early spring. Nationwide rainfall was the lowest since 2012. Elsewhere, southern Taiwan experienced its worst drought in 30 years, partly as a continuation of low rainfall from 2022. Drier conditions associated with El Niño are expected across southeast Asia in the coming months. The Mekong River Commission (MRC) observed developing drought conditions in northeastern Thailand between May and June.

Australia: The Bureau of Meteorology (BoM) noted soil moisture was below average across a wide band of Western and South Australia and in Queensland. Australia is bracing for escalating drought and increased bushfires as El Niño continues to develop in Q3/Q4.

Africa: Expanding drought in northern Africa and ongoing multi-year drought conditions in the Horn of Africa led to further failed harvests and a water shortage potential. Well below average wheat yields in 2023 were projected in Morocco, Algeria and Tunisia.

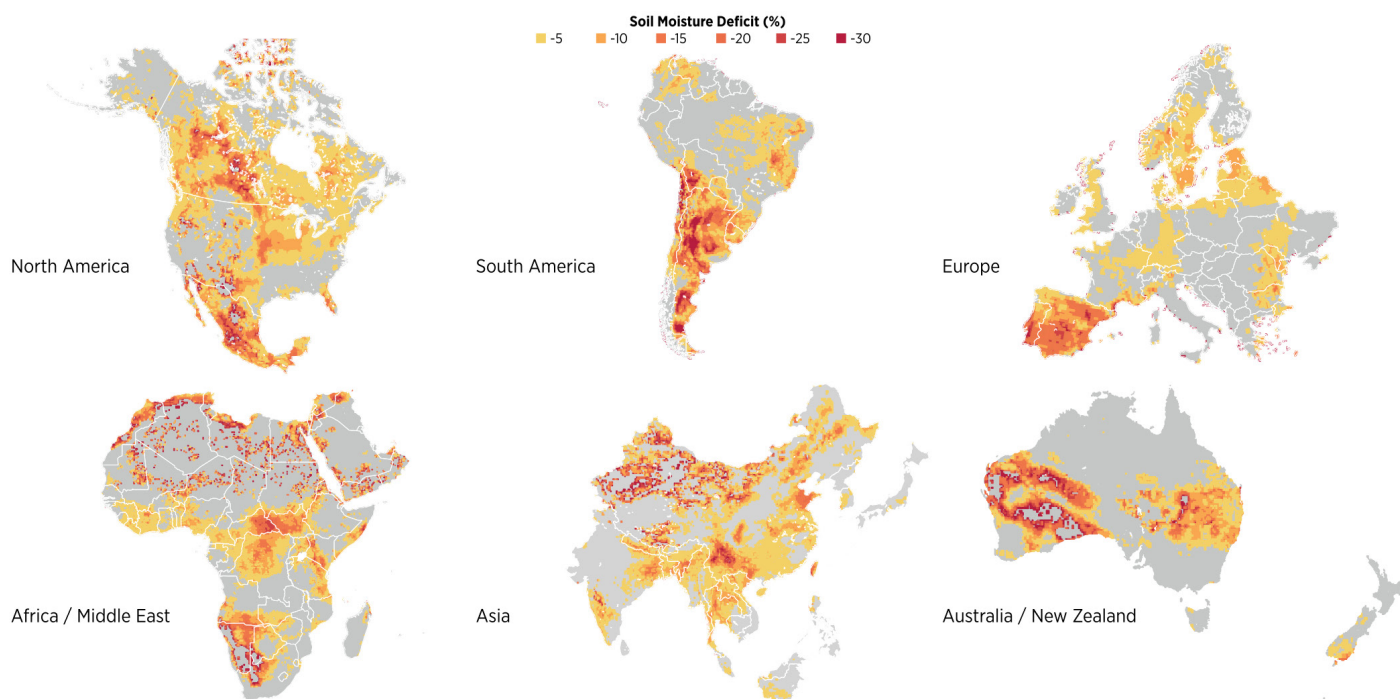


Figure 14: H1 2023 soil moisture deficit conditions compared to the 1991-2020 climatological normal. | **Data:** Copernicus (ERA5) | **Graphic:** Arthur J. Gallagher & Co.

Wildfires

Wildfires and excessive heat proved to be significant perils in H1 both in terms of economic loss and negative effects to the environment and human health. An unusually active start to the wildfire season was notable in parts of North America and Europe during Q2, particularly in Canada and Spain. Favorable wildfire conditions in the most affected countries were regionally enhanced by periods of excessive heat and sustained lack of precipitation, in addition to episodes of high winds.

Canada recorded roughly 8.2 million ha (20.3 million acres) burned in H1—which had grown to more than 10 million ha (24.7 million acres) by mid-July 2023—ranking as the largest annual wildfire extent in the country’s record (dating back until 1959). The previous record of 7.6 million hectares (18.8 million acres) was set in 1989. The fires in H1 had a notable impact on forestry, tourism, infrastructure and human health. According to National Resources Canada, most provinces have implemented a “let it burn” firefighting strategy if there is no imminent risk to life and property. Such strategy is conducive to more out of control fires as climate change makes the ground conditions more susceptible to explosive fire growth and behavior.

Early season heat in May aided in igniting large and damaging fires across regions of Western Canada, including British Columbia, Alberta and Saskatchewan. The Tantallon Fire, which burned in Nova Scotia in late-May, destroyed more than 200 structures. By June, lightning strikes ignited out of control fires in Ontario and Quebec. Smoke from the wildfires severely reduced air quality and led to health hazards across southern Canada, the Great Lakes, and the northern US in subsequent weeks. El Niño may aid further wildfire activity in coming months, as it is historically associated with warmer and drier conditions across Western Canada.

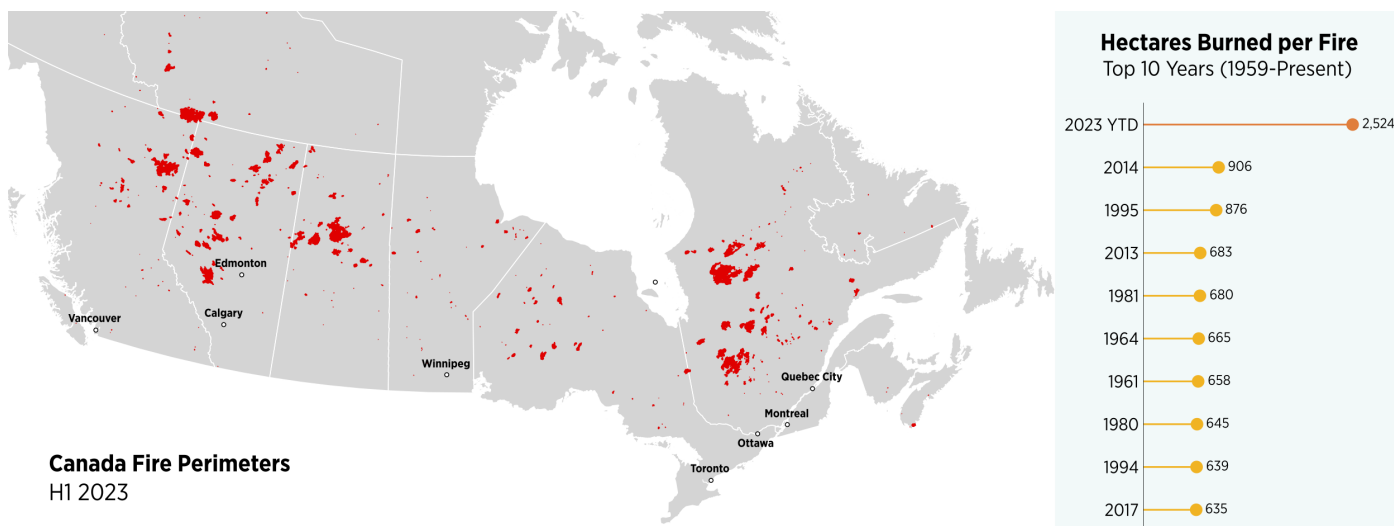


Figure 15: View of record-setting Canada wildfires in H1 2023.

Data: Canadian Interagency Forest Fire Center and Natural Resources Canada | **Graphic:** Arthur J. Gallagher & Co.

In Spain, data from the European Forest Fire Information System (EFFIS) indicated both a record area burned, and number of fires were observed between March and June, amid episodes of extreme heat and ongoing drought. In southern Spain, high temperatures in late April reached 38.8°C (102°F) at the Córdoba airport. In 2022, Spain endured their worst wildfire season in terms of area burned since at least 1994. Elsewhere, notable fire activity spread in parts of Germany in June.

In South America, Chile experienced a hyperactive wildfire season which peaked in February and resulted in economic damage that reached into the hundreds of millions (USD). With more than 430,000 ha (1.06 million acres) burned, the 2022/23 season (July to June) ranked as the second most active in terms of area affected for Chile since at least 1964.

What It Means: The development of El Niño may see more regions of the World including Australia exposed to increasing wildfire risks. The expansive loss costs associated with extreme heat, drought, and wildfires are putting major strains on the agricultural sector. Some of the most vulnerable regions in the world with respect to food insecurity are annually facing rising temperatures and reduced harvest yields as soil quality deteriorates. The development of parametric based insurance programs remain an important tool for the insurance industry, governmental entities, and other financial institutions to help subsidize underserved markets. As an example, Gallagher Re is the sole insurance broker to the African Risk Capacity (ARC) which utilizes parametric covers as a primary offering to the African continent.

Miscellaneous Events

Africa

Weather and climate related events in southern and central Africa resulted in more than 2,500 fatalities in H1. In Q2, a humanitarian crisis unfolded in early-May after heavy rainfall and subsequent floods struck nations in East-Central Africa. Flooding and landslides resulted in no fewer than 629 fatalities in the Democratic Republic of the Congo (471); Rwanda (135); and Uganda (23). The situation was worsened as similar regions were impacted by higher-than-normal rainfall in months leading up to the event. Governmental officials estimated the economic toll of the flooding to approach USD160M in Rwanda alone.

In early to mid-June, a series of cold fronts brought floods to populated regions of South Africa's Western Cape. Inundation and overflowing rivers significantly impacted the region's agricultural and citrus production.

UPDATE: Direct impacts from Cyclone Freddy, the record breaking and first Category-5 equivalent storm of 2023, claimed 1,434 lives in Southern Africa in February. Freddy generated the most significant damages in Madagascar, Mozambique and Malawi. In Malawi, at least 1,216 deaths were recorded, and economic losses exceeded USD500M. For additional details about Freddy, please see our **Q1 2023 Natural Catastrophe Report**. In South Africa, copious rains during the first half of February generated hundreds of millions (USD) in economic losses across northern and eastern provinces.

Asia

Asia was impacted by three major tropical cyclones (Biparjoy, Mawar and Mocha), two of which strengthened to Category-5 due to anomalous ocean warmth. Mawar tied with Phyllis (1958) as the strongest typhoon ever observed in May. Mocha, the deadliest Asia peril in H1, leveled Fani (2019) record as the strongest cyclone in the North Indian Ocean. The implementation of early warning systems, as echoed at the WMO Congress this year, has helped kept fatality counts low in many of such events.

Seasonal rains began to affect parts of India and China in June, but initial impacts and subsequent losses were fewer compared to recent years due to the late arrival of the monsoon. Nearly 500,000 people in India's Assam were affected by flooding in late June. China officially entered its plum rain season on June 18, and emergency responses were elevated in at least ten provinces. On June 8, torrential rains topped 453 mm (17.8 in) during a 24-hour period in Beihai, Guangxi Province. This was a June regional record.

Oceania

A major hailstorm associated with a cold frontal passage battered the Hunter and Central Coast regions in New South Wales, Australia on May 26. The Insurance Council of Australia (ICA) declared this as a "significant event". Most of the damage was incurred to automobiles, with the ICA citing at least 7,500 filed claims.

UPDATE: In New Zealand, the quick succession of the North Island/Auckland Floods and Cyclone Gabrielle in January and February resulted in challenges for the re/insurance market as both events generated billion-dollar (USD) insured losses. Auckland experienced their wettest January since 1853, and multiple stations broke monthly rainfall records in February due to prolific rainfall from Cyclone Gabrielle. For additional details about these events, please see our **Q1 2023 Natural Catastrophe Report**.

Europe

After an anomalously mild winter and a relatively quiet windstorm season for Europe in Q1, most attention remained on the heat, drought, and wildfire perils, all of which continue to be a concern for the continent in the second half of 2023.

An active stretch of severe convective storms (SCS), predominantly across Western and Central Europe, between June 18-23 resulted in notable losses in Belgium, France and Germany. Most significant were supercells and a convective system in Germany that were associated with areas of low pressure (Kay and Lambert), named by the Free University of Berlin. Notable hail driven losses were incurred in central / northern portions of the country, including Lower Saxony, Hesse and North Rhine-Westphalia.

A strong earthquake struck the Charente-Maritime department in southwestern France on June 16. The US Geological Survey magnitude 4.8 tremor was felt throughout much western France and caused notable damage to property and homes. The French Insurance Federation tallied more than 21,600 claims, with insured losses estimated to reach into the hundreds of millions (USD).

UPDATE: The catastrophic Kahramanmaraş earthquake sequence in February, which predominantly impacted Turkey and Syria, remained the costliest single event of 2023 through H1 both in terms of economic and insured loss. As of this publication, the death toll from the earthquake swarm had risen to at least 59,259 in Turkey (50,783) and Syria (8,476). A further 121,700 others were injured. For additional details about the Turkey earthquake sequence, please see our **Q1 2023 Natural Catastrophe Report**.

APPENDIX

January–June 2023 Events: Preliminary Statistics

Please note that the appendix solely includes a listing of global events that resulted in >USD100 million in economic loss and/or >10 fatalities. It does not include a listing of aggregated loss totals from agencies that are not easily attributed to an individual event. Economic losses are provided in USD millions and may be rounded in some instances.

Drought

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
China Drought	Feb. 1-Jun. 30	Asia	CN	775+	-
Spain Drought	Jan. 1-Jun. 30	Europe	ES	650+	-
Argentina Drought	Jan. 1-Jun. 30	Latin America	AR	5,000+	-
Brazil Drought	Jan. 1-Jun. 30	Latin America	BR	5,000+	-
Uruguay Drought	Jan. 1-Jun. 30	Latin America	UY	1,000+	-
US Drought	Jan. 1-Jun. 30	North America	US	>1,000	-

Earthquake

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
Jurm EQ	Mar. 21	Asia	AF, PK	-	21
Turkey and Syria EQ	Feb. 6-23	Europe	TR, SY	45,000+	59,259+
Courçon France EQ	Jun. 16	Europe	FR	300+	-
Guayas EQ	Mar. 19	Latin America	EC, PE	-	18
Western Azerbaijan EQ	Jan. 28	Middle East	IR	100+	3

European Windstorm

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
Gerard	Jan. 15-18	Europe	GB, FR, CZ, BE, DE, CH	100+	-
Larisa/Diethelm	Mar. 7-10	Europe	AT, BE, CZ, DE, FR, IE, GB, NL, LU	100+	-
Mathis/Markus	Mar. 30-31	Europe	GB, FR, CZ, BE, DE, CH	100+	2

Flooding/Landslides

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
Southern Africa Floods	Feb. 4-14	Africa	ZA, MZ, SW	385+	29
	Mar. 20-Apr. 1	Africa	ET	-	29
	Mar. 22-25	Africa	SO	-	22
	Mar. 23-27	Africa	KE	-	12
	Mar. 30-Apr.7	Africa	BI	-	14
	Apr. 1-28	Africa	AO	-	54
	Apr. 23-27	Africa	KE	-	12
	East-Central Floods	May 2-9	Africa	RW, UG, CD	170+
Philippines Flooding	Jan. 1-18	Asia	PH	30+	45
Serasan Landslide	Mar. 6	Asia	ID	-	50
	Mar. 18-20	Asia	PK	Millions	10
Torkham Landslide	Apr. 18	Asia	PK	-	12
Southeast China Floods	May 2-7	Asia	CN	200+	4
	Jun. 1-Jun. 5	Asia	CN	100+	Dozens
	Jun. 7-10	Asia	CN	160+	-
Seasonal Plum Rains	Jun. 17-Jul. 1	Asia	CN	2,050+	-
	Jun. 25-29	Asia	PK	-	32
	Mar. 15	Europe	TR	-	18
Italy Flood/Minverva	May 12-17	Europe	IT, BA, HR	9,730+	15
Ecuador Rainy Season	Jan. 1-Mar. 8	Latin America	EC	Millions	20
Peru Flooding H1	Feb. 5-Jun. 15	Latin America	PE	100+	79
Sao Paulo Floods	Feb. 18-20	Latin America	BR	Millions	64
Cyclone Yaku	Mar. 7-13	Latin America	PE	330+	6
Alausi Landslide	Mar. 26	Latin America	EC	Millions	33
Chimborazo Landslide	Apr. 26	Latin America	EC	-	23
Haiti June Floods	Jun. 3-5	Latin America	HT	Millions	58
June Extratropical Cyclone	Jun. 16-18	Latin America	BR	100+	16
CA Atmospheric River #1	Jan. 4-10	North America	US	850+	11
CA Atmospheric River #2	Jan. 11-16	North America	US	600+	2
CA Atmospheric River #3	Jan. 17-19	North America	US	140+	-
Western US Upper-Level Low	Feb. 21-22	North America	US	350+	-

Flooding/Landslides (continued)

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
CA Atmospheric River #4	Feb. 23-25	North America	US	400+	-
CA Atmospheric River #5	Feb. 26-Mar. 2	North America	US	215+	-
CA Atmospheric River #6	Mar. 9-12	North America	US	250+	2
CA Atmospheric River #7	Mar. 13-15	North America	US	600+	2
CA Bomb Cyclone	Mar. 21-23	North America	US	300+	5
Ft. Lauderdale Flash Flood	Apr. 10-13	North America	US	300+	-
North Island Floods	Jan. 26-Feb. 2	Oceania	NZ	1,600+	4

Severe Convective Storm

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
	May 5-10	Africa	SL	-	15
	Mar. 16-20	Asia	IN	Millions	16
	May 23-24	Asia	BD	-	18
	May 26	Asia	IN	Millions	13
	Jun. 10-11	Asia	PK	-	27
Pressure Lows Kay and Lambert	Jun. 18-23	Europe	AU, BE, CZ, DE, FR, SK	1,400+	1
Selma Tornado and SCS	Jan. 12	North America	US	825+	8
Houston Tornado and SCS	Jan. 24	North America	US	270+	-
	Feb. 7	North America	US	280+	-
	Feb. 15-17	North America	US	255+	-
Southern Plains Derecho	Feb. 26-28	North America	US	770+	1
Early March SCS and Wind	Mar. 1-3	North America	US	6,400+	13
Dallas-Fort Worth Hail	Mar. 16-17	North America	US	695+	-
Mississippi Tornado and SCS	Mar. 23-28	North America	US	2,300+	24
Central US Outbreak	Mar. 30-Apr. 1	North America	US	5,650+	33
Southern Plains Hail	Apr. 2	North America	US	150+	-
Early April US Outbreak	Apr. 3-5	North America	US	3,050+	6
Missouri Tornadoes and SCS	Apr. 14-16	North America	US	1,325+	-
Oklahoma Tornadoes and SCS	Apr. 18-22	North America	US	3,000+	3
Southern US Hail and SCS	Apr. 23-27	North America	US	1,325+	-
Late April Outbreak	Apr. 28-May 1	North America	US	815+	-
	May 2-9	North America	US	1,150+	1

Severe Convective Storm (continued)

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
Front Range and Midwest Hail	May 9-16	North America	US	2,625+	1
	May 17-20	North America	US	1,100+	-
	May 22-26	North America	US	590+	2
	May 23-25	North America	US	150+	-
	May 31-Jun. 4	North America	US	220+	-
	Jun. 5-8	North America	US	470+	-
Texas Hail and Southern SCS	Jun. 9-14	North America	US	2,900+	4
Early Summer Outbreak	Jun. 15-19	North America	US	3,000+	-
Great Lakes June SCS	Jun. 15-16	North America	US	475+	-
CO and TX Outbreak and SCS	Jun. 21-26	North America	US	>1,000	7
Midwest Derecho and SCS	Jun. 28-Jul. 4	North America	US	>1,000	-
Newcastle Hailstorm	May 26	Oceania	AU	135+	-

Tropical Cyclone

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
Tropical Storm Cheneso	Jan. 18-25	Africa	MG	20+	33
Cyclone Freddy	Feb. 21-Mar. 5	Africa	MG, MU, MW, MZ, ZW	340+	1,434
Cyclone Mocha	May 14-15	Asia	MM, BD, IN	80+	463
Typhoon Mawar	May 23-Jun. 2	Asia	GU, PH, TW, JP	530+	8
Cyclone Biparjoy	Jun. 15-17	Asia	PK, IN	250+	12
Cyclone Gabrielle	Feb. 11-17	Oceania	NZ	1,800+	11

Wildfire

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
Kazakhstan Wildfires	Jun. 8-15	Asia	KZ	-	15
Asturias Spring Wildfires	Mar. 20-Apr. 13	Europe	ES	100+	-
Kurgan Region Wildfires	May 6-11	Europe	RU	-	21
Chile Wildfires	Jan. 30-Feb. 18	Latin America	CL	500+	26
Tantallon Fire	May 28-Jun. 4	North America	CA	200+	-
Canada Q2 Wildfires	Apr. 1-Jun. 30	North America	CA	200+	-

Winter Weather (Snow, Cold, etc.)

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
	Jan. 5-10	Asia	IN	Millions	25
Afghanistan Cold Spell	Jan. 10-27	Asia	AF	-	166
Nyingchi Avalanche	Jan. 17-23	Asia	CN	40+	28
Tajik Avalanche	Feb. 15-16	Asia	TJ	Millions	20
	May 27	Asia	PK	-	11
Southern Plains Ice Storm	Jan. 30-Feb. 2	North America	US	400+	10
Northeast Freeze	Feb. 2-5	North America	US	1,950+	-
Eastern Canada Freeze	Feb. 3-5	North America	CA	160+	-
Upper Midwest Blizzard	Feb. 21-23	North America	US	265+	3
March Nor'easter	Mar. 13-15	North America	US	215+	-
Canada Spring Ice Storm	Apr. 5-6	North America	CA	350+	-

Other

Event Name	Date	Region	Countries Affected	Economic Losses (USD million)	Fatalities
India June Heatwave	Jun. 17-19	Asia	IN	-	166+
Mexico June Heatwave	Jun. 11-30	North America	MX	-	143+
US June Heatwave	Jun. 17-30	North America	US	-	14+

Country Abbreviations

Country Name	Abbreviation
Afghanistan	AF
Albania	AL
Algeria	DZ
American Samoa	AS
Andorra	AD
Angola	AO
Anguilla	AI
Antigua and Barbuda	AG
Argentina	AR
Armenia	AM
Australia	AU
Austria	AT
Azerbaijan	AZ
Bahamas	BS
Bahrain	BH
Bangladesh	BD
Barbados	BB
Belarus	BY
Belgium	BE
Belize	BZ
Benin	BJ
Bermuda	BM
Bhutan	BT
Bolivia	BO
Bosnia and Herzegovina	BA
Botswana	BW
Brazil	BR
Brunei	BN
Bulgaria	BG
Burkina Faso	BF
Burundi	BI
Cambodia	KH
Cameroon	CM
Canada	CA
Cayman Islands	KY
Central African Republic	CF
Chad	TD
Chile	CL

Country Name	Abbreviation
China	CN
Colombia	CO
Comoros	KM
Cook Islands	CK
Costa Rica	CR
Croatia	HR
Cuba	CU
Cyprus	CY
Czech Republic	CZ
Democratic Republic of the Congo	CD
Denmark	DK
Djibouti	DJ
Dominica	DM
Dominican Republic	DO
East Timor	TL
Ecuador	EC
Egypt	EG
El Salvador	SV
Equatorial Guinea	GQ
Eritrea	ER
Estonia	EE
Ethiopia	ET
Fiji	FJ
Finland	FI
France	FR
Gabon	GA
Gambia	GM
Georgia	GE
Germany	DE
Ghana	GH
Greece	GR
Grenada	GD
Guadeloupe	GP
Guam	GU
Guatemala	GT
Guinea	GN
Guyana	GY
Haiti	HT

Country Name	Abbreviation
Honduras	HN
Hong Kong	HK
Hungary	HU
Iceland	IS
India	IN
Indonesia	ID
Iran	IR
Iraq	IQ
Ireland	IE
Israel	IL
Italy	IT
Ivory Coast	CI
Jamaica	JM
Japan	JP
Jordan	JO
Kazakhstan	KZ
Kenya	KE
Kosovo	XK
Kuwait	KW
Kyrgyzstan	KG
Laos	LA
Latvia	LV
Lebanon	LB
Lesotho	LS
Liberia	LR
Libya	LY
Liechtenstein	LI
Lithuania	LT
Luxembourg	LU
Macau	MO
Macedonia	MK
Madagascar	MG
Malawi	MW
Malaysia	MY
Maldives	MV
Mali	ML
Malta	MT
Marshall Islands	MH
Martinique	MQ

Country Abbreviations (continued)

Country Name	Abbreviation
Mauritania	MR
Mauritius	MU
Mexico	MX
Micronesia	FM
Moldova	MD
Monaco	MC
Mongolia	MN
Montenegro	ME
Montserrat	MS
Morocco	MA
Mozambique	MZ
Myanmar	MM
Namibia	NA
Nepal	NP
Netherlands	NL
New Caledonia	NC
New Zealand	NZ
Nicaragua	NI
Niger	NE
Nigeria	NG
North Korea	KP
Northern Mariana Islands	MP
Norway	NO
Oman	OM
Pakistan	PK
Palau	PW
Panama	PA
Papua New Guinea	PG
Paraguay	PY
Peru	PE
Philippines	PH
Poland	PL
Portugal	PT
Puerto Rico	PR
Qatar	QA
Republic of the Congo	CG
Reunion	RE
Romania	RO

Country Name	Abbreviation
Russia	RU
Rwanda	RW
Saint Kitts and Nevis	KN
Saint Lucia	LC
Saint Vincent and The Grenadines	VC
Samoa	WS
Saudi Arabia	SA
Senegal	SN
Serbia	RS
Seychelles	SC
Sierra Leone	SL
Singapore	SG
Sint Maarten	SX
Slovakia	SK
Slovenia	SI
Solomon Islands	SB
Somalia	SO
South Africa	ZA
South Korea	KR
South Sudan	SS
Spain	ES
Sri Lanka	LK
Sudan	SD
Suriname	SR
Swaziland	SZ
Sweden	SE
Switzerland	CH
Syria	SY
Taiwan	TW
Tajikistan	TJ
Tanzania	TZ
Thailand	TH
Togo	TG
Tonga	TO
Trinidad and Tobago	TT
Tunisia	TN
Turkey	TR
Turkmenistan	TM

Country Name	Abbreviation
Tuvalu	TV
Virgin Islands (U.S.)	VI
Uganda	UG
Ukraine	UA
United Arab Emirates	AE
United Kingdom	GB
United States	US
Uruguay	UY
Uzbekistan	UZ
Vanuatu	VU
Venezuela	VE
Vietnam	VN
Virgin Islands (UK)	VG
Yemen	YE
Zambia	ZM
Zimbabwe	ZW

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