

# 2023 Catastrophe Review



## December 2023

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## Hurricane Season Review

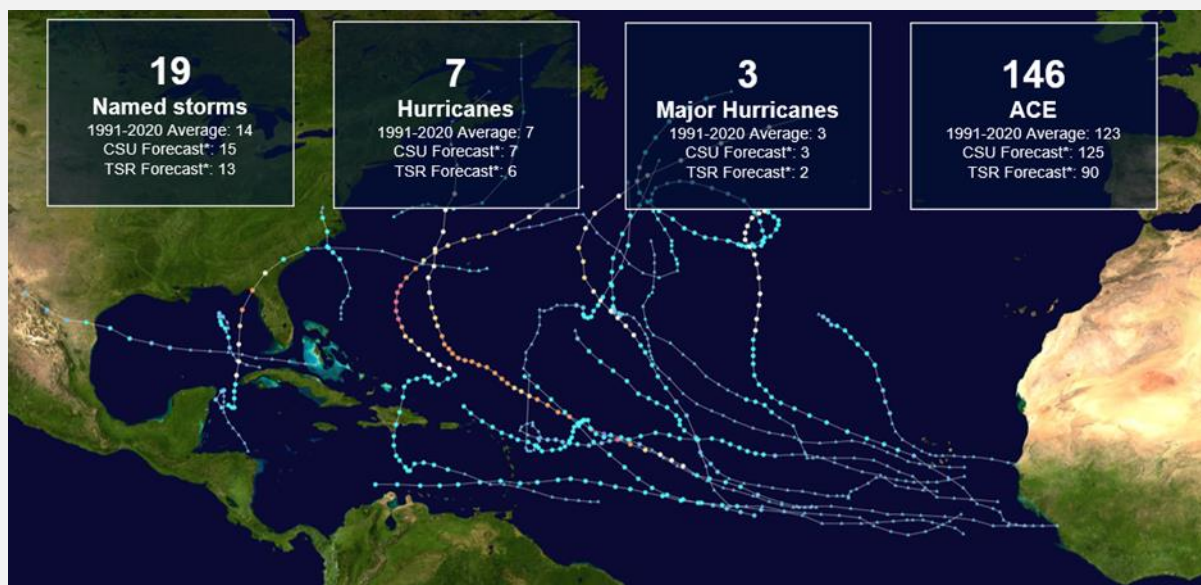
Heading into the 2023 Atlantic hurricane season, forecasters had all cited higher uncertainty than usual in their predictions, due to the competing factors of a developing El Niño environment and the warmest sea surface temperatures on record. Overall, the season ended up having positive activity, likely driven by the very warm sea surface temperatures, which provided significant energy for storm inception in the Atlantic, especially in the Main Development Region<sup>1</sup>.

There were 19 named storms during the season, clearly higher than the 30-year average of 14, and the Accumulated Cyclone Energy

(ACE)<sup>2</sup> was nearly 20% above the 30-year average. However, there were only 3 storms that eventually developed into Major Hurricanes (Category 3+), matching the 30-year average. There was an observed trend throughout the season that vertical wind-shear<sup>3</sup>, which is associated with El Niño<sup>4</sup>, had a material impact on weakening storm systems.

Figure 1 shows the storm tracks of the 2023 hurricane season, in addition to information about storm activity and the pre-season forecasts from Colorado State University (CSU) and Tropical Storm Risk (TSR).

**Figure 1: Atlantic Hurricane Activity Summary, 2023**



Source: Wikipedia, NOAA, Artemis. As at 14 November 2023. \*Forecasted numbers that are pre-season estimates because they get biased by observed activity in the season.

<sup>1</sup> The Main Development Region (MDR) is located in the North Atlantic Ocean between 10-20 degrees North, and 20-60 degrees West. It is where the vast majority of hurricanes develop.

<sup>2</sup> Accumulated cyclone energy (ACE) is a metric that describes the energy released by a hurricane during its lifetime. It is calculated by summing the square of a tropical cyclone's maximum sustained wind speeds, measured every six hours, then divided by 10,000.

<sup>3</sup> Vertical wind shear is the change in wind speed/direction as one goes higher in the atmosphere. Strong vertical windshear disrupts hurricane formation by having the effect of "pushing them over" as they are forming.

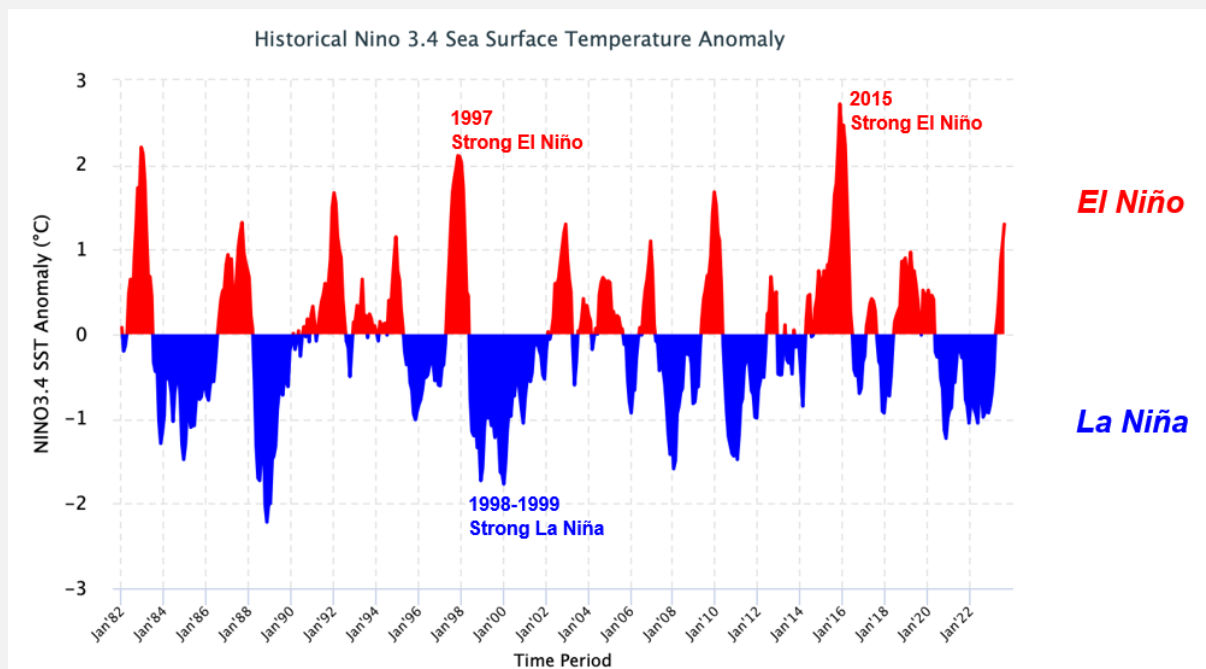
<sup>4</sup> El Niño is a climate pattern involving the warming of the central and eastern tropical Pacific Ocean, which has a downstream effect of increased vertical wind shear in the Atlantic.

While long range predictions are challenging, we can look ahead to next year, with the current expectation of El Niño likely to remain. The National Oceanographic and Atmospheric Administration’s (NOAA) latest forecast indicated a 60% chance of El Niño remaining through April-June 2024.<sup>5</sup>

This is important for the 2024 hurricane season, as when looking at the historical data we typically see reduced hurricane activity during El Niño years. The negative relationship between El Niño and hurricane activity tends to be more significant for more pronounced El Niño signals (e.g., 1997 and 2015). However,

for more moderate El Niño or La Niña signals, the correlation to hurricane activity becomes much weaker. It will also be important to track sea surface temperatures going into the next hurricane season because if they remain elevated, then this may fuel another active year. There was this year, and likely next year, a battle between warm sea surface temperatures (which provide more energy for hurricane formation) and El Niño conditions (which suppresses hurricane formation).

**Figure 2: El Niño and Sea Surface Temperature**



Source: www.climate.gov. As at 18 October 2023.

### Notable Hurricane Events

The costliest event from an insurance loss perspective in the Atlantic was Hurricane Idalia, landfalling as a Category 4 storm. Idalia made landfall in the “Big Bend” region of Florida, specifically in an area with low population and therefore low exposure, limiting the impact to the low billions of US-Dollars. If the storm had moved further north or south, the event itself

was severe enough that it may have caused much more significant damage.

Hurricane Lee was the only Atlantic hurricane to reach Category 5 strength during the 2023 season. Lee became a named storm on 5 September and three days later, experienced rapid intensification to become a Category 5 hurricane with wind speeds of more than 260km/h. Despite the storm weakening, it

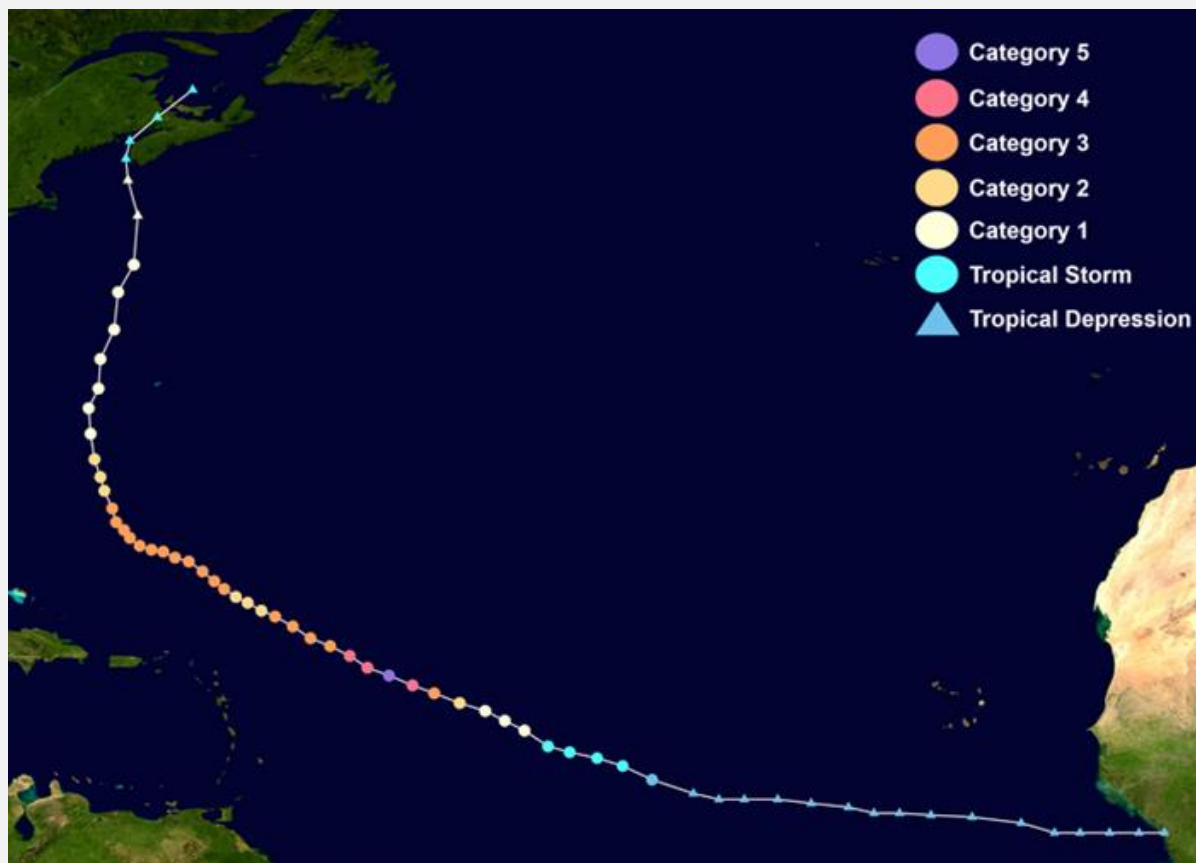
<sup>5</sup> [https://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/enso\\_advisory/ensodisc.shtml](https://www.cpc.ncep.noaa.gov/products/analysis_monitoring/enso_advisory/ensodisc.shtml)



continued to move northwards and made landfall in Nova Scotia, Canada, bringing with it damaging winds and storm surge. Figure 3 below shows the track of Hurricane Lee, with

each data point indicating 6-hour interval maximum sustained wind speeds.

**Figure 3: Path and Intensity of Hurricane Lee**



Source: [https://en.wikipedia.org/wiki/Wikipedia:WikiProject\\_Tropical\\_cyclones/Tracks](https://en.wikipedia.org/wiki/Wikipedia:WikiProject_Tropical_cyclones/Tracks)

In October, Hurricane Otis became the first Pacific hurricane to make landfall in Mexico as a Category 5 storm. In doing so, it eclipsed Hurricane Patricia (2015) as the strongest East Pacific landfalling hurricane on record. The storm underwent rapid intensification to strengthen from a tropical storm to a Category 5 storm in just 24 hours, with wind speeds increasing by over 160km/h in the same period

according to the National Hurricane Center<sup>6</sup>. Significant damage was reported in the tourist area of Acapulco, with initial industry loss estimates indicating a range between USD 3-6bn.

<sup>6</sup> National Hurricane Center, Hurricane Otis Discussion Number 12

<https://www.nhc.noaa.gov/archive/2023/ep18/ep182023.discus.012.shtml?>

**Figure 4: Worldwide Catastrophic Events, 2023**



Source: Twelve Capital.

### Other Peril Regions

The key message to take from 2023 is that despite not observing any significant loss causing hurricanes in the Atlantic, insured losses around the world were still significant and look set to remain above USD 100bn for the 6th year running (Gallagher, 2023)<sup>7</sup>. The driving peril this year was convective storms (commonly known as tornado and hail), contributing approximately two-thirds of the 2023 global insured losses. U.S. convective storms contributed more than USD 50bn alone, with Aon reporting that there were potentially seven convective storms exceeding USD 1bn in insured losses per storm in Q3 alone<sup>8</sup>. Hailstorms also heavily impacted regions across Europe, in particular in northern Italy in July which is currently expected to cause insured losses of over EUR 2bn. For context, the entire Italian non-life insurance market generated approximately EUR 44bn of gross written premium in 2022<sup>9</sup>, highlighting that the event caused a significant impact for the local market.

Increased temperatures globally also demonstrated that wildfire risk is a global

phenomenon and not just limited to California or Australia, where we have seen heavy losses in previous years. The Hawaii wildfires caused insured losses of approximately USD 5bn and wildfires across Europe caused widespread damage and disruption.

In February 2023, there was a significant 7.8 magnitude earthquake on the border between central Turkey and northern Syria. Damages across both countries were reported to be significant but with only USD 5bn of reported industry losses to date, illustrating the size of the protection gap in these regions. The event also raised questions regarding the building standards in the region and highlighted the importance that enforcing building codes plays in risk mitigation.

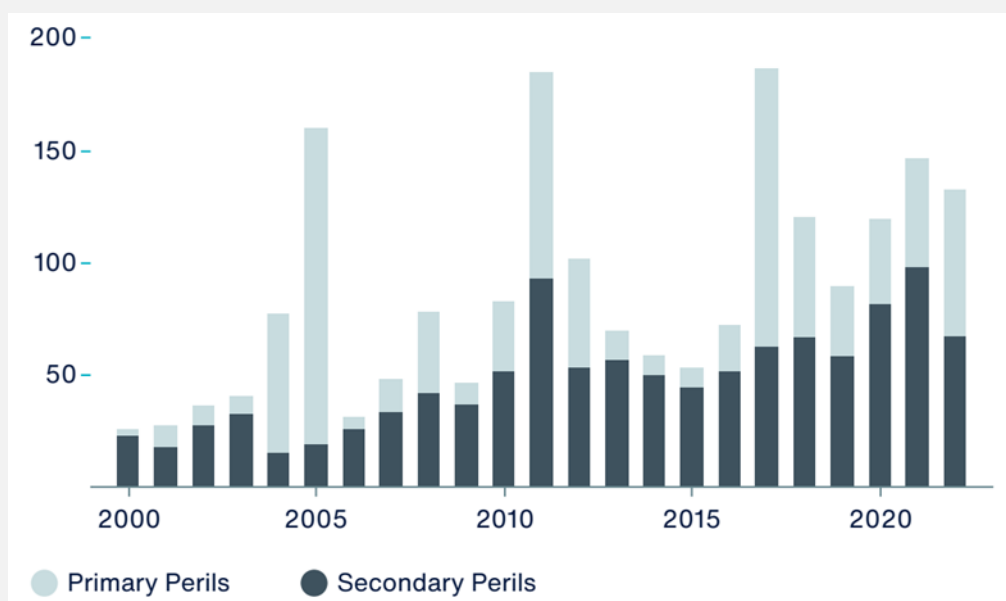
Figure 5 illustrates how the contribution from secondary perils has increased through previous years. The graph does not include data for 2023 yet, which we are expected to be in excess of USD 60bn of insured losses from secondary perils, further continuing the trend of increasing secondary peril losses.

<sup>7</sup> Gallagher Re Q3 2023 Natural Catastrophe Report - <https://www.ajg.com/gallagherre/news-and-insights/2023/october/natural-catastrophe-report-q3-2023/>  
<sup>8</sup> Aon Q3 Global Catastrophe Report - <https://www.aon.com/getmedia/7107985e-43d8-412b->

[a674-7722112cc2b0/20231018-q3-2023-catastrophe-recap.pdf](https://www.aon.com/getmedia/7107985e-43d8-412b-a674-7722112cc2b0/20231018-q3-2023-catastrophe-recap.pdf)

<sup>9</sup> Swiss Re Institute – Sigma Explorer <https://www.sigma-explorer.com/>

**Figure 5: Global Annual Insured Losses by Primary/Secondary Peril**



Source: Aon 2023 Weather, Climate and Catastrophe Insight Report, Page 16.

### Impact on Twelve Capital’s Positions

Despite another year of significant industry losses around the globe, the approach at Twelve Capital to focus on covering well modelled and clearly defined peak perils has resulted in minimal impact on its portfolios.

With U.S. convective storms causing over USD 50bn worth of insured losses, it was certainly a test to the Cat Bond market to understand how these losses would impact investors. Aggregate erosions of transactions covering convective storms were certainly impacted, but at the time of writing, the current impact to the market is expected to be minor, with the impact to Twelve Capital's positions in particular expected to be even less than the market, given our “Peak-Peril” approach.

In addition, there were also minor impacts to aggregate erosions from Winter Storm Elliot (December 2022) and the Turkey Earthquake (February 2023), but these impacts were in addition to losses already driven from Hurricane Ian in 2022, and did not cause any impact on a stand-alone basis.

Lastly, the latest available data on Hurricane Otis indicates to an expected 50% payout on the FONDEN IBRD Class D Notes, which use a parametric trigger based on central pressure estimates. This bond constitutes a minimal position in our portfolios, and as such a payout from this transaction will not have material impact on performance.

**Twelve Capital AG**

Dufourstrasse 101  
8008 Zurich, Switzerland  
Phone: +41 (0)44 5000 120

**Twelve Capital (UK) Ltd**

Moss House, 15-16 Brook's Mews  
London W1K 4DS, United Kingdom  
Phone: +44 (0)203 856 6760

**Twelve Capital (DE) GmbH**

Theatinerstrasse 11  
80333 Munich, Germany  
Phone: +49 (0)89 839316 110

info@twelvecapital.com  
www.twelvecapital.com

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