March 2022

US Severe Convective Storm (SCS) Outlook

By TransRe's Catastrophe Research Team

ENSO IMPACTS THE SPATIAL DISTRIBUTION OF HAILSTORM AND TORNADO ACTIVITY IN THE US.

NOAA Climate Prediction Center latest advisory:
Expect La Niña in March-May 2022

During La Niña spring season, there is a higher frequency of hailstorm and tornado events compared to an El Niño.

- **La Niña:** We can expect tornado and hailstorm activity to be **more frequent** in southern central US (Tornado Ally).
- **El Niño:** We can expect tornado and hailstorm activity to be **less frequent** in southern central US and an increase in frequency in western US.

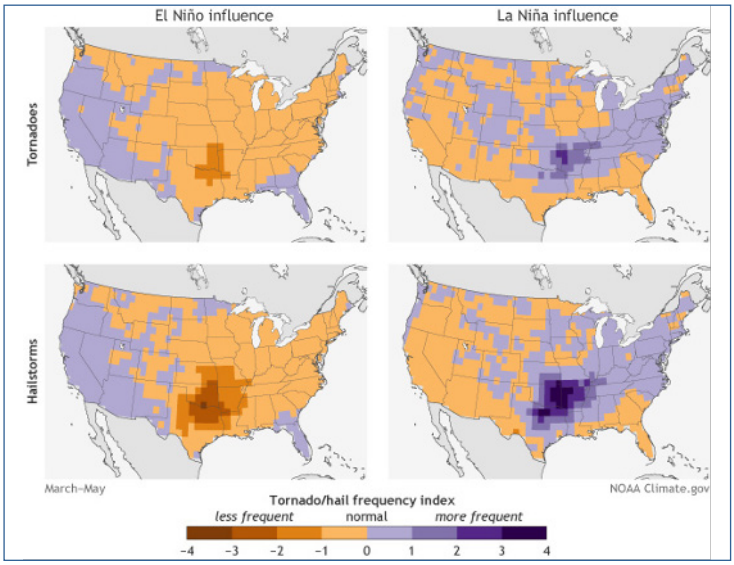

Figure 1: Tornado and hail frequencies during March-May during El Niño (left column) and La Niña (right) states (source: NOAA Climate.gov) - purple indicates higher storm frequency

ACCUWEATHER PROJECTS AN "ACTIVE SEVERE SEASON"

- **April** is expected to be the **most active** month (twice as active as last year).
- Due to the prolonged draught in the High Plains, the **majority of severe weather** is expected to occur outside of Tornado Alley.
- **Areas of highest risk** include eastern Arkansas, Texas through the Gulf States, Tennessee Valley, mid-Mississippi Valley and the Ohio Valley.
- There is a **very high risk** for destructive thunderstorms and tornadoes to occur in areas hit by the rare **December 2021 derecho and tornado outbreak** (December 10-11).
- During the second half of spring, expect a **higher risk** of flooding and the possibility of **severe weather** across the Ohio Valley.

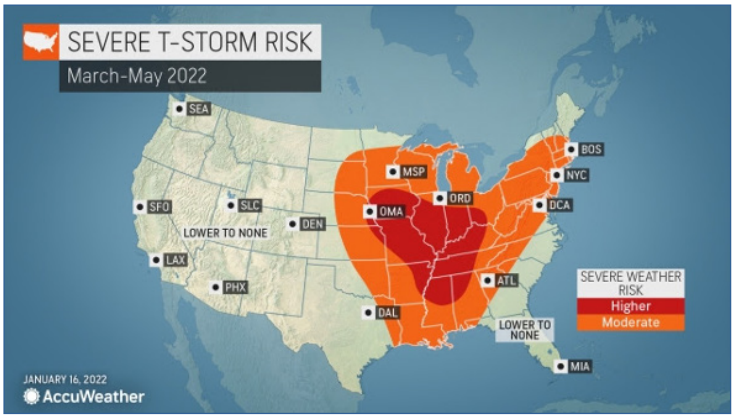

Figure 2: AccuWeather's spring outlook projection for severe weather

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SCS FREQUENCY AND SEVERITY TRENDS

The increasing trend observed in SCS frequency since 1950 is partly due to reporting biases.

- Before 1970's there was no formal reporting system
- Inconsistent data collection methods – reports from the public (event spotters)
- Under-reporting – pre-1979 non-severe events were neglected. Events tend to be reported when there is property damage.
- Population bias – influenced heavily by population density
- NWS started issuing severe-thunderstorm warnings in 1980's
- Technology & social media improved reporting in 2000's
- Radar data has only been used since 2010

Key factors resulting in uplifting trend in SCS losses are mainly driven by the population growth in hail/tornado-prone areas, larger size of newer homes and an increase in concentration of asset (urbanization). Our trended losses account for GDP growth, inflation and population growth. The normalized losses take into account other socioeconomic factors such as a shift in population density and urbanization.

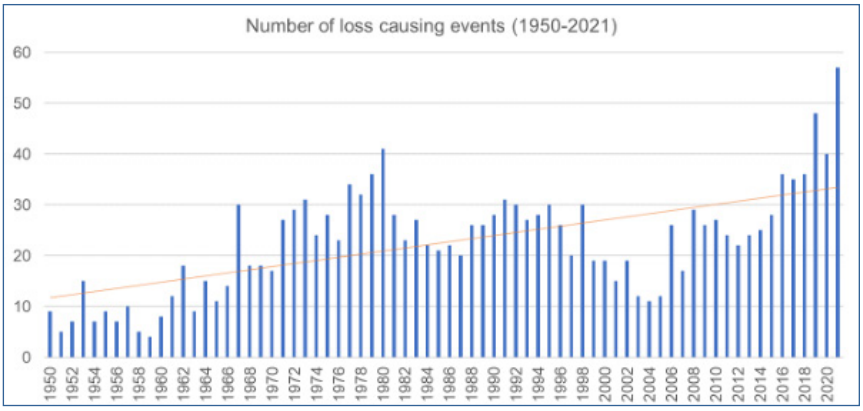

Figure 3: Trend in the number of loss causing SCS events since 1950

DECADE	TOTAL # OF EVENTS	AVERAGE ($ MIL)		
		PCS @ TIME	TRENDED LOSS (2022)	NORMALIZED LOSS (2022)
1952-1961	84	44	2,149	13,063
1962-1971	177	114	3,589	16,840
1972-1981	306	429	4,668	15,447
1982-1991	246	1,238	6,226	14,049
1992-2001	244	3,741	11,537	18,061
2002-2011	203	8,899	14,448	16,003
2012-2021	**351**	**17,748**	**20,845**	**20,845**

Table 1: Decadal trend in average property damage from SCS events

CLIMATE CHANGE AND SCS

Not much is known what effect climate change might have on hail climatology. A study published in 2017 in Nature Climate Change Journal suggests:

- Decrease in the frequency of small hail events in the future
- More frequent occurrence of larger hail events
- This leads to an anticipated increase in hail damage potential

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