National Oceanic and Atmospheric Administration
U.S. Department of Commerce

Hazards at a Glance

Severe Convective Storms Reference Guide

NOAA Severe Convective Storms Data for Insurance Professionals

This reference guide provides an overview of NOAA's products and tools that are most relevant to insurance industry professionals for training or data reference scenarios. This data helps insurers anticipate multi-hazard impacts, evaluate loss drivers, and support underwriting and claims response strategies.

What are Severe Convective Storms?

Severe convective storms (SCS) are one of the most common forms of damaging weather across the United States. Three of the most common SCS hazards are tornadoes, hail, and strong wind. Any combination of these hazards can occur within a single storm and can result in significant loss.

Severe Convective Storms account for the highest number of events costing 1 billion dollars or more in damage.[1]

Key Hazards

Tornadoes

- The **presence of a tornado** classifies a storm as severe
- Rated after damage surveys using the Enhanced Fujita (EF) Scale, based on observed damage rather than direct wind measurements
- Most common in the central U.S. during spring, but can occur anywhere year-round

Hail

- **≥1.0 inch in diameter** is classified as severe
- Can damage vehicles, break windows, and impact building exteriors
- Size can vary significantly within a storm and across short distances
- Often occurs alongside strong winds and heavy rainfall

Severe Wind[2]

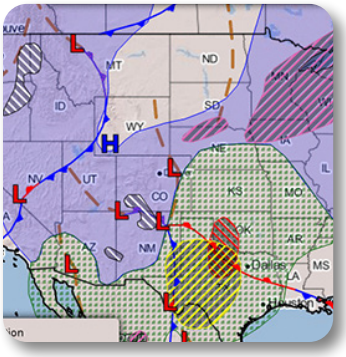
- Considered severe at **≥58 mph**
- Can occur with any SCS, often producing widespread impacts
- Particularly notable during derecho events
- Can cause downed trees, power outages, and structural damage across large areas

[1] "The Convective Storm Crisis: 5 Property Ratemaking Enhancements to Address Unprecedented Losses," Homeowners Hub (blog), Verisk, Jul 29, 2024
[2] NOAA Wind Reference Guide, 2026

Access Products and Resources for Insurers and Reinsurers:
ncei.noaa.gov/about/our-impact/insurance-reinsurance

Modeling and Verification

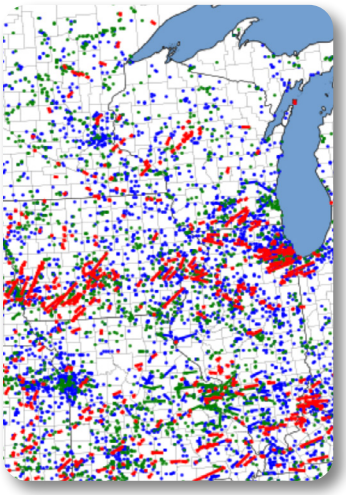
Ahead of the event, industry professionals may use outputs from global and/or regional models to inform and validate Catastrophe Models. **To access, visit the NOAA Operational Model Archive and Distribution System.**



Forecasts and Outlooks

Forecasts provide a specific prediction about future weather while outlooks give a more broad, long-term view. Insurers can utilize this data to prepare for weather events, implement moratoriums, and inform underwriting strategies.

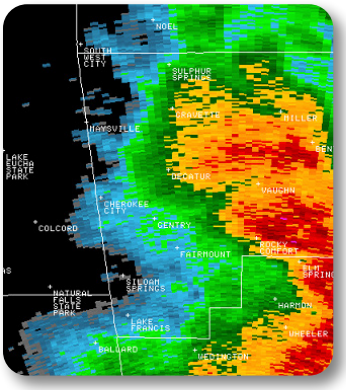
- **Weather.gov:** View localized forecasts, active watches and warnings, and current conditions. ***Format:*** *Geospatial*
- **SPC Convective Outlooks:** Categorical risk outlooks for the next three days with probabilistic forecasts out to day-8. Use in conjunction with mesoscale discussions and active watches/warnings to understand current and near term threats. ***Format:*** *Shapefile, KML*



Archived Data and Climatologies

Historical data and long-term weather patterns help insurers improve underwriting precision, streamline claims verification, and develop more accurate Catastrophe Models.

- **Event Footprint Catalog:** Geospatial records of significant weather events, includes event metadata and narratives. ***Format:*** *CSV, PDF, Geospatial*
- **Tornado, hail, and severe wind climatology:** Annual tornado counts, 20-year watch climatology, and 30-year climatology for tornadoes, severe, wind, and severe hail. ***Format:*** *CSV, netCDF*
- **Storm Events Database:** Records spanning over 75 years that include storm locations, intensity, and narratives. ***Format:*** *CSV*
- **Damage Assessment Toolkit:** Detailed tornado tracks with damage reports and damage images. ***Format:*** *Shapefile, KML*
- **Archived NEXRAD:** Level 2 and Level 3 radar data going back to 1991. ***Format:*** *Available in multiple spatial formats depending on access method*



Real-Time Decision Making

Up-to-the-minute weather and environmental information collected by way of satellites, buoys, weather stations, and citizen scientists. This data can be integrated into a carriers alert systems to better prepare their insureds for weather events.

- **IDSS Forecast Points:** Interactive point and click map across the U.S. that gives hour-by-hour and daily trends across dozens of weather variables.
- **Multi-Radar/Multi-Sensor System (MRMS):** A suite of products integrated across radar, observations, models, and more for national analysis of hail, precipitation, convection, and other hazards. ***Format:*** *GRIB2*
- **NWS Radar Viewer:** View national radar or individual NEXRAD stations products such as reflectivity, velocity, and hydrometeor classification. ***Format:*** *Geospatial*