

NOAA National Severe Storms Laboratory



saving
lives & property



NOAA National Severe Storms Laboratory enhances NOAA's capabilities to provide more accurate and timely forecasts and warnings of hazardous weather events to save lives, protect property and enhance economic viability.

NSSL supports NOAA's National Weather Service by conducting research to advance our understanding of weather processes and improve forecasting and warning tools used by forecasters. Severe weather is NSSL's passion and mission.

NSSL conducts field projects aimed at increasing our understanding of various aspects of the atmosphere and severe weather to improve NOAA's ability to perform its mission. For example, the lab aims to improve its understanding of how environmental factors characteristic of the southeastern United States affect the formation, intensity, structure, and path of tornadoes in the Southeast through the field project Verification of the Origins of Rotation in Tornadoes EXperiment-Southeast, or VORTEX-SE. In addition, more than 50 researchers deployed to the Great Plains in 2019 for TORUS, or Targeted Observation by Radars and UAS of Supercells, to understand the relationships between severe thunderstorms and tornado formation.

NSSL employs meteorologists, hydrologists, physicists, engineers, computer specialists and social scientists to meet their mission.

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The United States experienced several flooding events in 2019, including the Washington, D.C. metro area. The NWS issued the first-ever flash flood emergency for D.C. proper on July 8, as intense rainfall resulted in hundreds of water rescues and damage to businesses. NSSL's Multi-Radar Multi-Sensor System, with improved rainfall estimation rates, and the Flooded Locations And Simulated Hydrographs Project, or FLASH, proved indispensable. This research-to-operations success is making a significant, tangible difference in improving NWS capabilities to warn communities in advance when hazardous weather threatens.



The Forecasting a Continuum of Environmental Threats, or FACETS paradigm, is a proposed next-generation hazardous weather watch and warning framework that is modern, flexible, and designed to communicate clear and simple hazardous weather information to the public. It aims to provide continuous probabilistic hazard information guidance on environmental hazards from time frames of multiple weeks through less than one hour. Social and behavioral scientists are studying how the public receives and uses severe weather information to help NWS forecasters, emergency managers and broadcast meteorologists improve communication.



The NOAA National Severe Storms Laboratory is working on short-term high resolution numerical models to provide improved warning and forecast lead times for the public. The Warn-on-Forecast (WoF) system is expected to improve forecasts, warnings, and decision support for high-impact thunderstorm events within the watch-to-warning time frame, 0-6 hours in advance of an event. WoF is designed to provide accurate predictions of thunderstorm hazards — like tornadoes, hail, wind, and flash flooding — to people who need them earlier than is currently possible with detection based techniques. The fundamental concept of WoF is to provide continuous, probabilistic predictions of hazards in individual thunderstorms.

