

Data Assimilation Team

Website: <https://pdam.oucreate.com/>

One of the goals of National Oceanic and Atmospheric Administration (NOAA) is to provide forecasts and warnings for weather and water events, with a purpose to prevent loss of life and property and to enhance the national economy. In support of this goal, NOAA [National Severe Storms Laboratory's](#) (NSSL) [Warn-on-Forecast](#) program (WoF; [Stensrud et al. 2009](#)) is developing a frequently-cycled, probabilistic, convective-scale, numerical weather prediction (NWP) model-based ensemble system, which is referred to as the [Warn-on-Forecast System](#) (WoFS). The vision of the WoF program is to fill the gap in NWS forecasters' current watch-to-warning paradigm for severe thunderstorm, tornadoes, heavy rainfall, flash floods and other hazardous weather, where guidance from NWP models currently play a less significant role. The frequently updated WoFS ensembles are post-processed to provide probabilistic forecast guidance, which is anticipated to enhance NWS forecasters' abilities to provide a more continuous flow of probabilistic forecasts for high-impact weather between the watch and warning spatial and temporal scales. This guidance supports the concepts of the NOAA [Forecasting a Continuum of Environmental Threats](#) program (FACETs; [Rothfus et al. 2018](#)), which aims to modernize the current NWS watch and warning system with a more continuous flow of probabilistic hazard forecasts on increasingly fine spatial and temporal scales. This modernization is expected to better support weather-related decisions for a variety of end users.

Effective data assimilation is crucial to providing the WoFS with an accurate depiction of individual thunderstorms and surrounding environments. The CIMMS/NSSL's Data Assimilation team is dedicated to the research and development of the WoFS. The WoFS assimilates radar, satellite, surface, and upper-air observations every 5-15 min, requiring data assimilation strategies that can effectively integrate storm-scale information into the background mesoscale environment. The data assimilation team is working continuously on improving storm-scale data assimilation techniques, focusing on both ensemble methods and the hybrid methods between a pure ensemble and pure variational approach. Forecasts up to 6 hours are produced from these analyses at sub-hourly intervals to predict the life cycle of individual thunderstorms and thunderstorm systems and their associated hazards.

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