2010 Experimental Warning Program spring experiment

The National Severe Storms Laboratory (NSSL) has played a key role in the development and evaluation of applications and technology to improve NWS severe convective weather warning operations. The development process at NSSL begins with basic and applied research including field experiments, theoretical studies, and case studies designed to better understand storms and relate weather to remotely sensed signatures. This research leads to the development of technological applications, including computer algorithms employing sophisticated image processing and artificial intelligence, and innovative display systems [e.g., the Four-dimensional Stormcell Investigator (FSI)], and NSSL leads the path in new Doppler radar technologies. Evaluations are conducted using archived case studies as well as real-time proof-of-concept tests at the Hazardous Weather Testbed during actual severe weather warning operations. Feedback from the evaluations leads to further research and refinement of applications, and ultimate operational applications for users. The new concepts continue to be tested to determine whether they will be included in future operational systems that help guide and manage the severe weather warning decision-making process.

The primary objectives of the 2010 EWP Spring Program are as follows:

- To **evaluate the accuracy and the operational utility of new science, technology, and products** in a testbed setting in order to **gain feedback** for improvements prior to their potential implementation into NWS severe convective weather warning operations.
    - The Hazardous Weather Testbed serves as a primary vehicle for transitioning new research, knowledge, and concepts into NWS operations. It is designed to provide forecasters with direct access to the latest developments in meteorological research while imparting scientists with the knowledge to formulate research strategies that will have practical benefits for operations.
- To **foster collaboration** between research scientists and operational meteorologists.
    - The WFOs are the EWP's primary customers. This collaboration helps researchers and developers to better understand operational warning requirements. This will also allow for continued scientific collaboration on application development, and on informal and formal publications. This interaction will provide a synergy that will lead to improvements in future warning products and services.

The overall objectives of the specific projects to be conducted during the 2010 EWP Spring Program are:

- To evaluate operational utility of **Phased Array Radar (PAR)** technology during real-time operational warning situations as well as through playback of archived cases. Two fundamental questions arising from the spring experiments are:

    - What are potential operational impacts of higher temporal resolution data on the warning decision process?

    - What additional warning lead time might be gained?

  The purpose of this study is to develop and execute a data collection strategy that lays the methodological foundation required to answer these questions. Analysis of data collected will provide the first rigorous assessment of operational impacts of high-temporal resolution data.

- To evaluate operational utility of **Collaborative Adaptive Sensing of the Atmosphere (CASA) dense radar networks** for severe weather decision-making through real time warning situations and structured experiments with archived data. The goals are to:

    - Observe decision-making and communication interactions among spotters, emergency managers, and NWS forecasters as severe weather (hail, high winds, tornadoes) passes through the CASA test bed using enhanced NWS Chat, WDSS-II, and AWIPS.

    - Identify advantages of CASA's low-level, real time wind products and forecasts in determining areas of greatest risk for severe weather.

    - Obtain ground truth validation of CASA data.

- To evaluate operational utility of experimental applications intended for the **GOES-R satellite platform**, including **total lightning data,** during real-time operational warning situations as well as through playback of archived cases.

    - Assess various satellite-based applications, including convective initiation applications for the pre-storm environment, and an overshooting-top algorithm.

    - Evaluate GOES-R psuedo-GLM products including mean, median, and maximum flash footprint and flash rate of storms for use in storm interrogation and warning decision making.

- To evaluate the operational utility of **multiple-radar/multiple-sensor severe weather algorithms** in supporting NWS hazardous convective weather warning decision making. We would like our participants to:

    - Provide feedback on the ability of these applications to enhance traditional base-radar data analysis in warning decision making.

    - Suggest improvements or new multiple-radar/sensor products that will aid warning decision making.

- Forecasters may have an opportunity to evaluate various **radar data assimilation algorithms** that may be used within future **Warn-On-Forecast** systems. More information about this activity will be posted online when it becomes available.

More detailed information about the individual experiments, including specific objectives, evaluation details, and technology user manuals, will be made available in separate documents online.