HMT-HPC Winter Weather Experiment

The Winter Weather Experiment was established to support improvements in HPC’s winter weather forecasts. In its first two years the experiment has hosted 25 visiting forecasters, researchers, and model developers with 7 different HPC forecasters serving as weekly facilitators. The focus of the experiment has varied from exploring the role of high resolution convection allowing models in improving forecasts of precipitation type, snow and freezing rain accumulations, and mesoscale snowbands (2011), to exploring methods to better quantify and communicate resolution convection allowing models in improving forecasts of precipitation type, snow and freezing rain.

Operational Impacts:

- 4 km NAM CONUS nest added to the Winter Weather Desk blender
- Parallel SREF tested extensively prior to operational implementation
- 4 km convection-allowing ensemble from the Air Force Weather Agency (AFWA) available to NCEP centers
- Exposed forecasters to cutting-edge tools and techniques
- Provision of access to reforecast dataset from the Earth Systems Research Laboratory (ESRL) in 2011

QPF Component of the HWT Spring Experiment

Despite considerable model advances, warm season QPF continues to be a significant forecast challenge. In 2010 and 2011, HMT-HPC collaborated with the Hazardous Weather Testbed (HWT) to add a QPF component to their annual Spring Experiment. The QPF component explored the use of high resolution convection-allowing models and ensembles to improve warm season QPF:

Operational Impacts:

- Increased use of high resolution guidance by HPC QPF forecasters
- Increased availability of high resolution models at HPC
- High resolution "poor-man’s" ensembles can be both operationally viable and provide valuable forecast guidance

Atmospheric River Retrospective Forecasting Experiment

In September 2012, HMT-HPC hosted the Atmospheric River Retrospective Forecasting Experiment. This experiment focused on the predictability of west coast heavy rain events at 3-5 day lead times with a particular focus on the utility of the 2nd generation reforecast dataset from the Earth Systems Research Laboratory (ESRL) and high resolution ensembles.

Operational Impacts:

- HPC actively pursuing real time access to reforecast dataset
- Use of high resolution guidance encouraged because of improved topographic representation

MetWatch Desk Prototype

During the summer of 2012, HMT-HPC helped prototype a new “meteorological watch” function at HPC. The proposed new forecast desk would be responsible for the 24/7 issuance of short-term event-driven Mesoscale Precipitation Discussions (MPDs), with the goal of providing enhanced situational awareness of potential flash flood events. The desk is currently scheduled to become operational in Spring 2013.

Object-Oriented Verification

Since 2010, HMT-HPC has been using the Method for Object-Based Diagnostic Evaluation (MODE) tool to verify 24 hour precipitation forecasts. The MODE tool is an object-oriented verification technique developed by the Developmental Testbed Center (DTC) that provides additional information about why a forecast was correct or incorrect (spatial displacement, axis angle difference, etc.). MODE verification is available daily at HPC through an internal website.

CSTAR Collaboration

Through the Collaborative Science, Technology, and Applied Research (CSTAR) Program, HMT-HPC is working with Stony Brook University (SBU) to identify tools to improve forecasts of high impact weather. As part of this collaboration, a Rossby Wave Packet tool developed by SBU has been transferred into HPC operations, and the 2013 Winter Weather Experiment will explore SBU’s ensemble sensitivity analysis tool.