The Hydrometeorological Testbed at the Weather Prediction Center (HMT-WPC)

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with contributions from WPC: Mike Bodner, Faye Barthold, David Novak, and Tom Workoff

2013 NOAA GPM Workshop
WPC Operational Desks

- **QPF**
- **Winter Weather**
- **Medium Range**
- **Alaska Med. Range**
- **Met Watch**
- **Model Diagnostics**
- **Short Range**
- **Surface Analysis**
- **International**
- **Tropical**
- **Air Quality**
HMT – WPC

Goal: Transfer science and technology innovations into operations to improve prediction of heavy precipitation

Roles:

• Identify and test new datasets to improve WPC forecasts (out to 7 days)
• Develop tools and techniques for operational use
• Provide training in new techniques to forecasters
HMT-WPC Focus and Methods

Focus: Improve and extend prediction of heavy precipitation

Approach:
• Improve understanding of heavy precipitation phenomena
• Improve application of high-resolution and ensemble guidance

Real-Time Collaborative Experiments

Test New Datasets
Develop New Tools/Techniques
Train Forecasters & Researchers

Warm-Season
Winter Weather
Atmospheric River

18 December 2010
2012 Atmospheric Rivers Retrospective Experiment

- Hosted 17 forecasters, researchers, and model developers at WPC
- Used 8 past cases over the 2008-2011 time period
- Verified using RFC precip analysis and HMT AR Observatories

Experiment Questions:

- Does the HMT-ensemble, multi-model ensemble, and reforecasting dataset improve extreme precipitation forecasts?
- What are the strengths & weaknesses of current model guidance?
- How can forecasters add value to extreme precipitation forecasts?
## 2013 Winter Weather Experiment

### Featured Datasets

<table>
<thead>
<tr>
<th>Provider</th>
<th>Model</th>
<th>Resolution</th>
<th>Forecast Hours</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMC</td>
<td>SREF (21 members)</td>
<td>16 km</td>
<td>87</td>
<td>Operational SREF</td>
</tr>
<tr>
<td>EMC</td>
<td>NAM</td>
<td>12 km (parent) 4 km (nest)</td>
<td>84 60</td>
<td>Operational NAM; includes 12 km parent model and 4 km nest</td>
</tr>
<tr>
<td>HPC</td>
<td>Autoensemble (28 members)</td>
<td>32 km</td>
<td>72</td>
<td>Composed of 21 SREF members, GEFS mean (2), ECMWF mean, and deterministic NAM, GFS, CMC, and ECMWF</td>
</tr>
<tr>
<td>AFWA</td>
<td>WRF (10 members)</td>
<td>20 km</td>
<td>144</td>
<td>UKMET boundary and initial conditions</td>
</tr>
<tr>
<td>AFWA</td>
<td>WRF (10 members)</td>
<td>4 km</td>
<td>72</td>
<td>Multi-physics, multi-initial condition convection-allowing ensemble</td>
</tr>
<tr>
<td>EMC</td>
<td>NAM</td>
<td>12 km (parent)</td>
<td>84</td>
<td>New snow accumulation algorithm based on modified SLR technique (rime factor)</td>
</tr>
</tbody>
</table>

* all other operational guidance was also available to the participants
FY13 Flash Flooding and Intense Rainfall (FFaIR) Experiment

Meteorology
- 0 – 12 h probabilistic rainfall forecasts
- Satellite (GOES-R PG)
- High-res Ensembles
- HRRR

Hydrology
- QPE
- River Stages
- Flash Flood Guidance
- FLASH hydrologic model

Probabilistic Flash Flood threat product

HRRR 15 h precip

FLASH Return Frequency
• Accelerate R2O by developing, testing, and operationalizing emerging tools and datasets
  • Real-time and retrospective experiments
• Collaborate with entire community
  • WFOs, OAR Labs, Private sector, Academia, NCEP, GOES-R PG
• Facilitate a positive feedback loop between model and technique developers, researchers, and forecasters