Hydrometeorology Testbed (HMT) Overview

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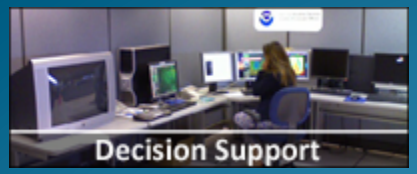
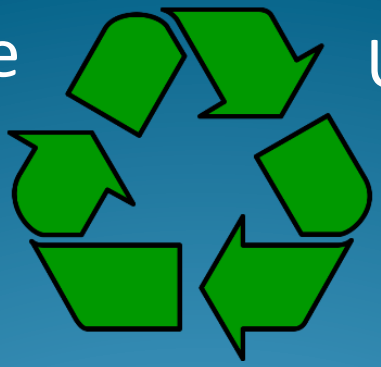
NOAA Testbed and Proving Ground Workshop, 14-16 April 2015

HMT Priorities

Observe

Understand





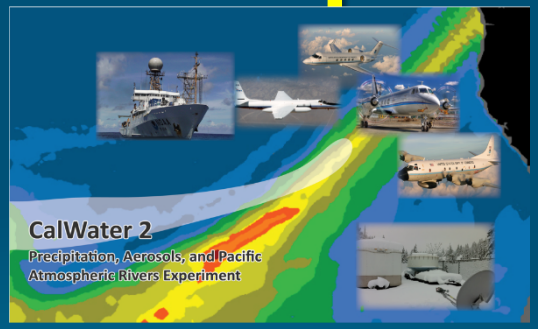
Predict

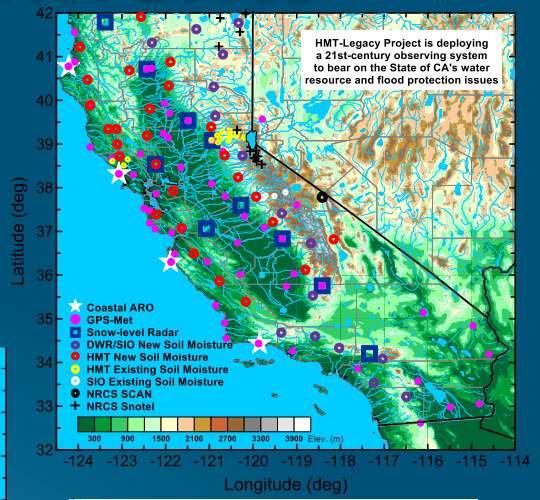
Strategic Context for HMT

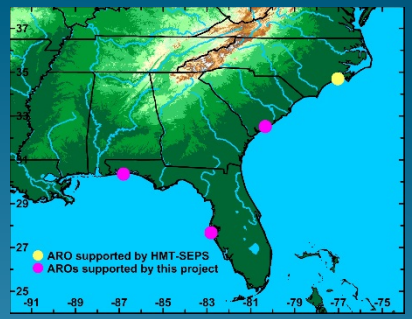
- NOAA Strategic Goals Addressed
  - NOAA Goal: Weather Ready Nation: society is prepared for and responds to weather-related events
  - NOAA 5-yr Objective: Exploit emerging data types and observing capabilities to satisfy NOAA's observing requirements and to support new and improved applications, products, and services
  - OAR Science Question: How can we improve forecasts, warnings, and decision support for high-impact weather events?
- ESRL Strategic Goal Addressed
  - Improved observations and understanding of Earth system processes

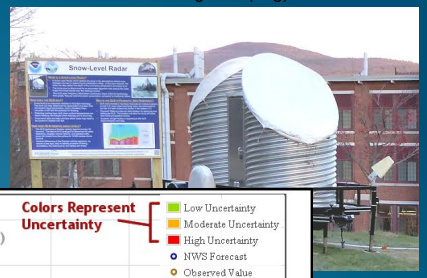
HMT Recent Accomplishments

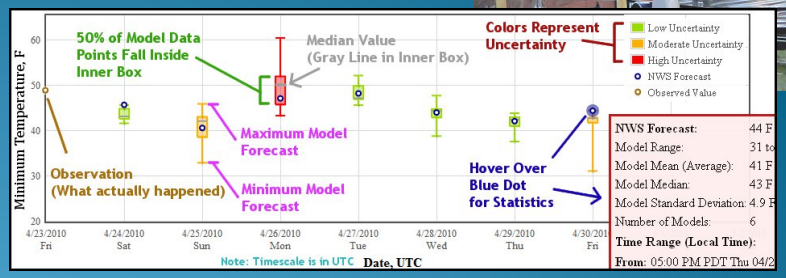
- California HMT-Legacy Network
  - Final surface sites installed
  - Lease agreements for 3 AROs
- CalWater 2015 Field Campaign
  - 57 research flights
  - 29 days at sea
- HMT-SEPS/Sandy Supplemental
  - Four AROs in Southeast US
  - Snow-level radar at Plymouth, NH
- NOAA's Russian River Habitat Blueprint
  - Frost/excessive heat forecast tool
  - 8 "inversion" towers
- 2014 research publications (16)
  - 9 focused on QPE, 2 on QPF,
    5 on physical process understanding
- Winter Weather and Flash Flood Experiments







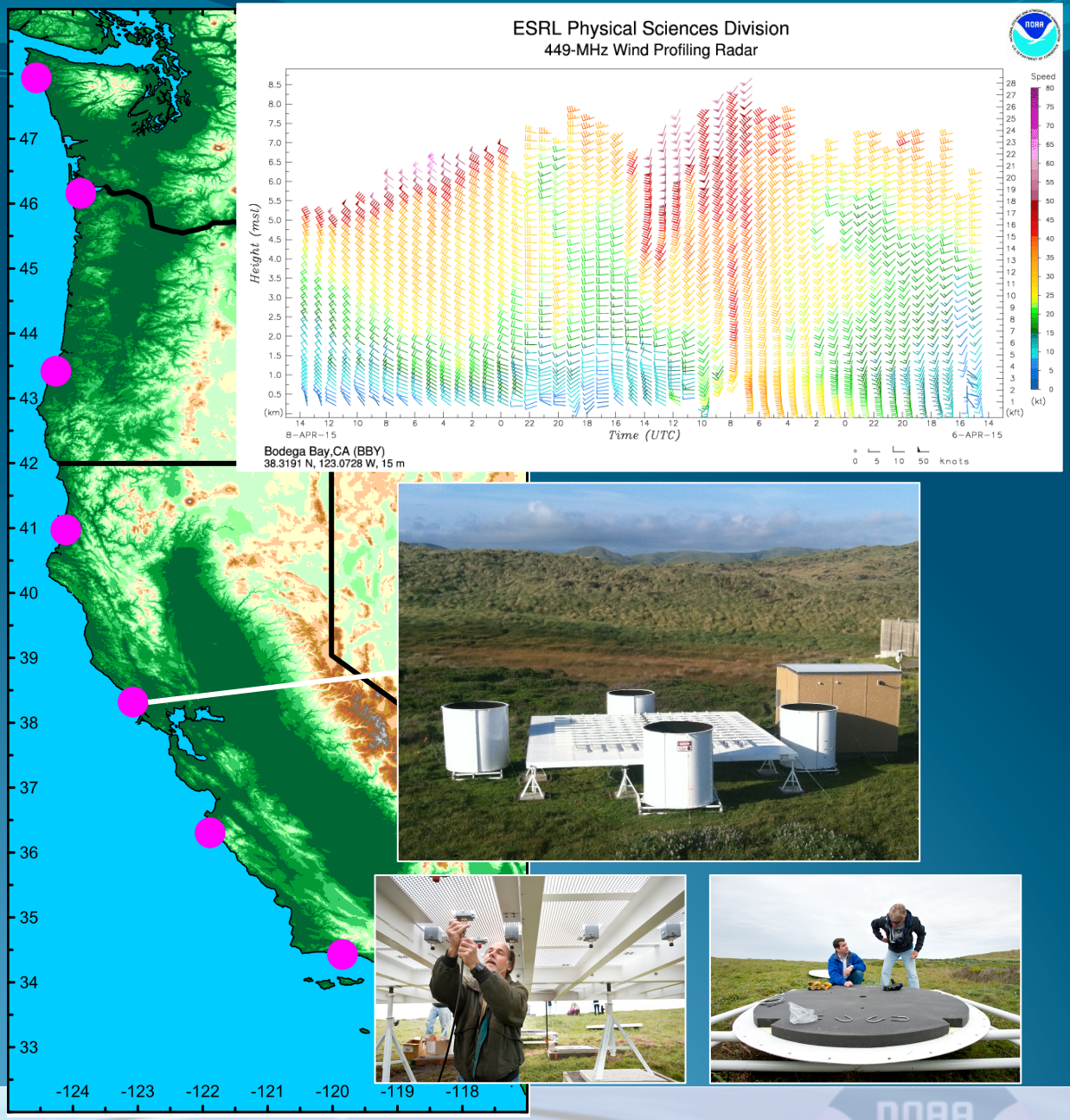




hmt.noaa.gov
wpc.ncep.noaa.gov/hmt/

Coming in 2015

HMT is installing a “picket fence” of Atmospheric River Observatories (AROs) along the West Coast for weather and wind energy applications. Funding for the network was provided by the California Dept. of Water Resources and the U.S. Dept. of Energy. The network will be completed in 2015.



R2O Spectrum

RESEARCH TO OPERATIONS

EXTERNALLY FUNDED PARTNERS
-NGGPS
-OAR R2O
-HMT/HWT
-Others

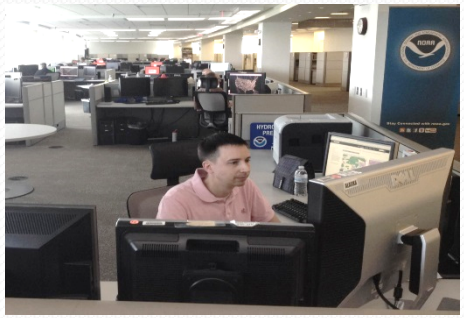
HMT-PSD Development Group

Interactive Experiments

HMT-WPC

NGGPS Liaison	Vice Workoff	Sarah Perfater

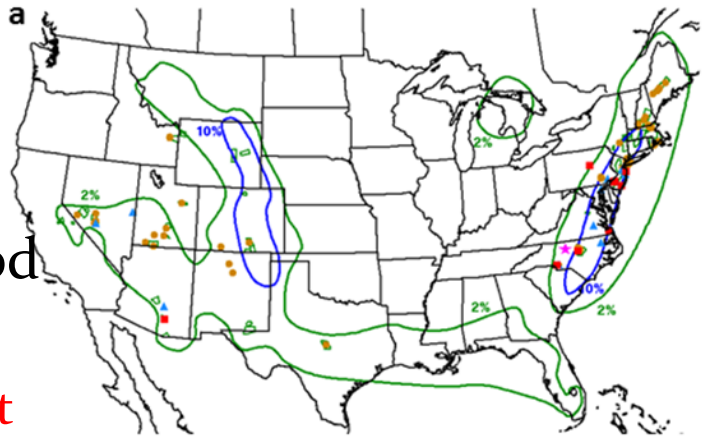
WPC Development and Training Branch



Flash Flood and Intense Rainfall Experiment

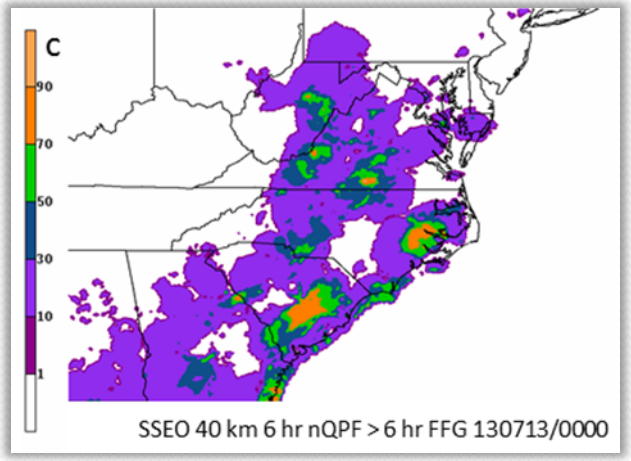
July 7-25, 2014

- 23 participants: operations, research, and academia
- Daily Activities
  - 18 hr CONUS probabilistic flash flood outlook (18-12 UTC)
  - 6 hr event-driven probabilistic flash flood forecasts (18-00 UTC and 00-06 UTC)
    - Collaboration with HWT-Hydro experiment
  - Subjective evaluation exercises



FFaIR 18 hr Flash Flood Outlook valid 140716/1200 and flash flood warnings (green), flash flood LSRs (brown), flood LSRs (blue), mPING reports (red), USGS stream gage exceedance (pink)

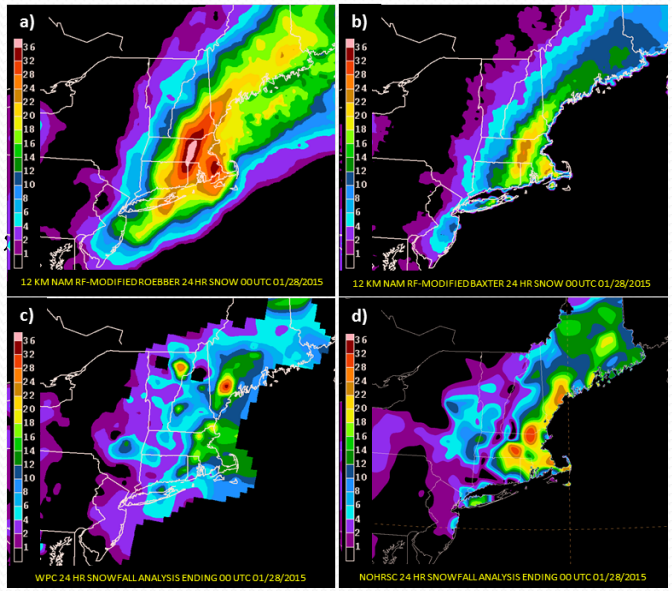
- Key datasets and findings:
  - Flash Flood Observation Database
  - Effective probabilistic guidance
    - (hi-res ensembles paired with FFG)



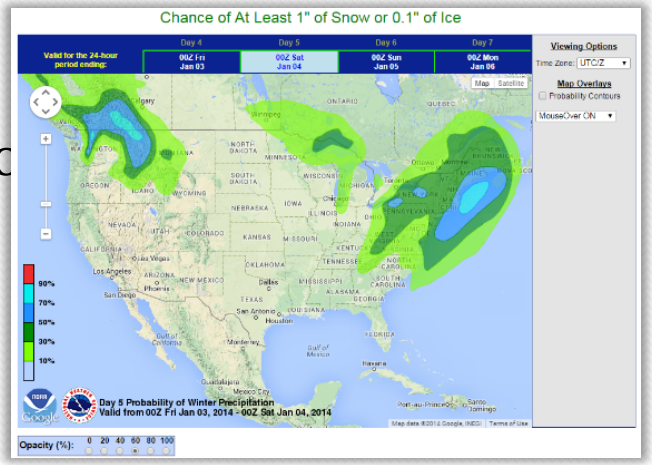
2015 Winter Weather Experiment

12 January – 13 February 2015

- 28 participants: operations, research, and academia
- Daily Activities
  - 24 hr deterministic snowfall forecast
  - Day 4-7 probabilistic winter precipitation, heavy snow and freezing rain forecasts
    - Daily webinar to interested NWSFOs
  - Subjective evaluation exercises



- Key datasets and findings:
  - Microphysics-based parameters (rime factor, percent of frozen precipitatic provide value to the forecaster.
  - Day 4-7 winter weather products effective; well received



Upcoming Activities

2015 FFaIR: July 6-25 at WPC

Focus: 1) Use of additional hydrologic parameters
2) Expanding probabilistic Flash Flood forecasts to Day 2
3) Communication of uncertainty

NGGPS Funded Partner Projects

- Bosart and Keyser, SUNY Albany, "An Investigation of the Skill of Week Two Extreme Temperature and Precipitation Forecasts at the NCEP-WPC"
- Colle and Chang, Stony Brook University, "Validation of Significant Weather Features and Processes in Operational Models Using a Cyclone Relative Approach."

HMT Competition

- To Be Announced Soon

FY16 R2O Thrust

RESEARCH TO OPERATIONS

Establishing and Improving Probabilistic Services

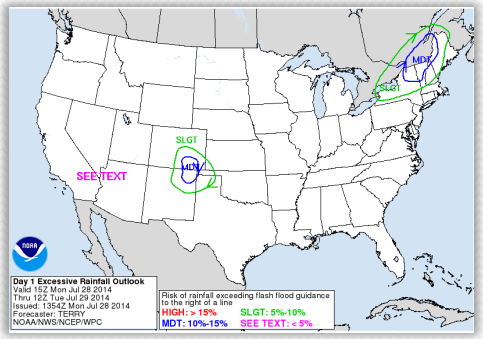
-Particular focus on the forecaster and tools

Flash Flood and Intense Rainfall Experiment

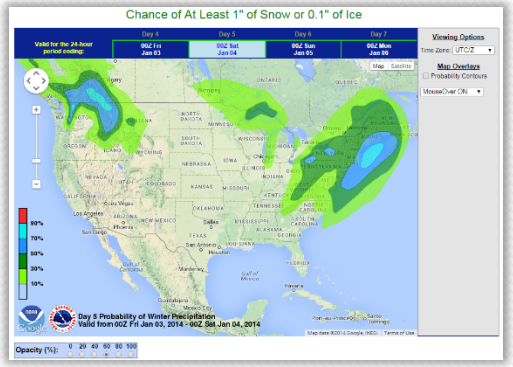
Winter Weather Experiment

Medium Range Experiment?

NWS Hydrology Program



NWS Winter Wx Program



NWS Public Program

Day 8, 9, and 10 forecasts?

Challenges and Opportunities

Explosion of competitive funding avenues

-New experience for HMT-WPC.

Sustaining sufficient infrastructure

-Increasing project management, IT, and data management complexity

-Need to acquire/develop these skillsets

Flash Flood and Intense Rainfall Experiment

-Lots of momentum and expanding community support

Winter Weather Experiment

-Building community support

-Needs community focus

Medium Range Experiment?

NWS strategic direction, but insufficient investment and focus to date