The State of HMT-West

HMT-West Annual Meeting
Santa Rosa, CA ◆ October 7-8, 2010

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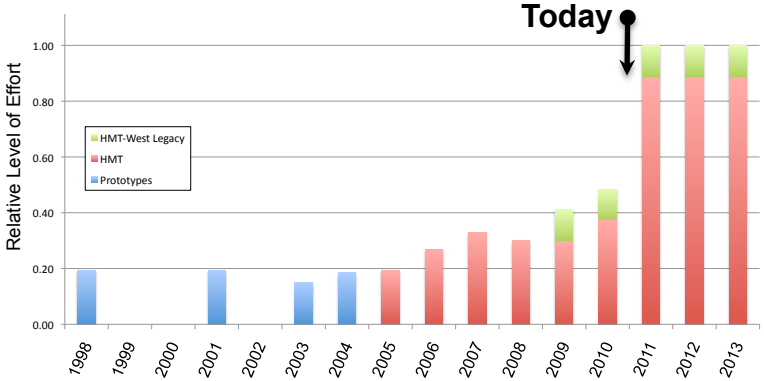
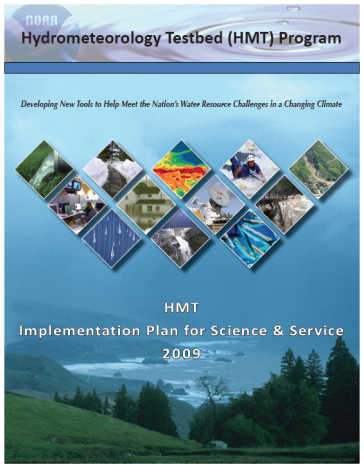
The Punch Line…



- This is a pivotal year for HMT
- HMT is entering it's 6th "official" year (but building on 12 years of ongoing progress)
- HMT has made significant strides in a number of areas
- HMT is poised for an infusion of new funds and the development of a major new testbed in the SE
- Challenges remain, especially in regard to how we define success, transition and manage growth

What's New?

- Growing and diversified geographic scope
- Refocused HMT Major Activity Areas
- First HMT Implementation Plan (2009; ~140 pp.)
- Major revamp of web page
  - Active updates of HMT news stories



NOAA HOME WEATHER OCEANS FISHERIES CHARTING SATELLITES CLIMATE RESEARCH COASTS CAREERS

Hydrometeorology Testbed

Home About Field Programs Data Meetings Publications News Resources

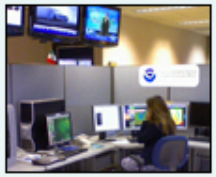
Tools for Water in a Changing Climate

What's New...

September 3, 2010
HMT links with joint NOAA-NASA efforts related to a new NASA satellite

August 26, 2010
Publication Notice: "A Seven-Year Wind Profiler-Based Climatology of the Windward Barrier Jet along California's Northern Sierra Nevada"

Major Activity Areas



Decision Support

Hydrologic Applications

Quantitative Precipitation Estimates

Quantitative Precipitation Forecasting

Snow Information

HMT is a national research strategy of regional demonstration projects directed to improving the accuracy and lead time of extreme precipitation and flood forecasts and warnings, to better understand and manage water resources in a changing climate.

NOAA Hydrometerology Testbed
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Select Accomplishments

http://hmt.noaa.gov/about/accomplishments.html

- Development of "demonstration" performance measures for snow level and extreme precipitation predictions
- Atmospheric river real-time monitoring and prediction tool invented and demonstrated
- Interactive, near real-time QPF verification tools developed through collaboration with DTC
- Key HMT-West findings are being implemented in California through a major partnership with the State's Department of Water Resources (DWR)
- Field experiments document gaps in current capabilities and explore new radar methods ranging from better use of existing radar data to polarimetric algorithms for QPE and gap-filling radar technologies

		HMT Major Activity Area				
Phenomena	Paper	QPE	QPF	SI	HA	V/ DST
Atmospheric Rivers (8)	Bao'06		✓		✓	✓
	Junker'09		✓			✓
	Neiman'08a	✓	✓	✓	✓	✓
	Neiman'08b	✓	✓	✓	✓	✓
	Ralph'06		✓		✓	✓
	Ralph'05a		✓			✓
	Ralph'04		✓		✓	✓
	Wick'08		✓		✓	✓
Warm Rain Processes (4)	Kingsmill'06	✓	✓			✓
	Martner'08	✓	✓		✓	✓
	Neiman'05	✓	✓		✓	✓
	White'03	✓	✓		✓	✓
Orographic Effects (7)	Neiman'10	✓				✓
	Neiman'06		✓			
	Neiman'04		✓			✓
	Neiman'02		✓		✓	✓
	Nuss'01		✓			✓
	Smith'10		✓			✓
	Ralph'03	✓	✓		✓	✓
Observing Systems (15)	Dabberdt'05	✓	✓		✓	✓
	Gourley'09	✓			✓	✓
	Lundquist'09	✓		✓	✓	
	Lundquist'08a			✓	✓	
	Lundquist'08b			✓	✓	
	Martner'07	✓				
	Matrosov'10	✓		✓		✓
	Matrosov'09	✓		✓		
	Matrosov'08	✓		✓		✓
	Matrosov'07	✓		✓		
	Matrosov'05	✓				✓
	Matrosov'04	✓		✓		
	Neiman'09		✓	✓	✓	✓
	White'02			✓	✓	✓
	White'00	✓		✓		
Precipitation Forecasting (7)	Ralph'10		✓			✓
	Jankov'09		✓			✓
	Jankov'07		✓			
	Junker'08		✓			✓
	Morss'07	✓	✓		✓	✓
	Ralph'05b	✓	✓	✓	✓	✓
	Yuan'08		✓			
Physical Processes (9)	Zamora'10				✓	
	White'10		✓	✓	✓	✓
	Andrews'04		✓		✓	
	Coplen'08	✓				
	Jorgensen'03	✓	✓		✓	
	Persson'05		✓		✓	✓
	Restrepo'08	✓			✓	✓
	Richiardone'09					✓
	Wilczak'07					✓

50 peer reviewed papers since 2000

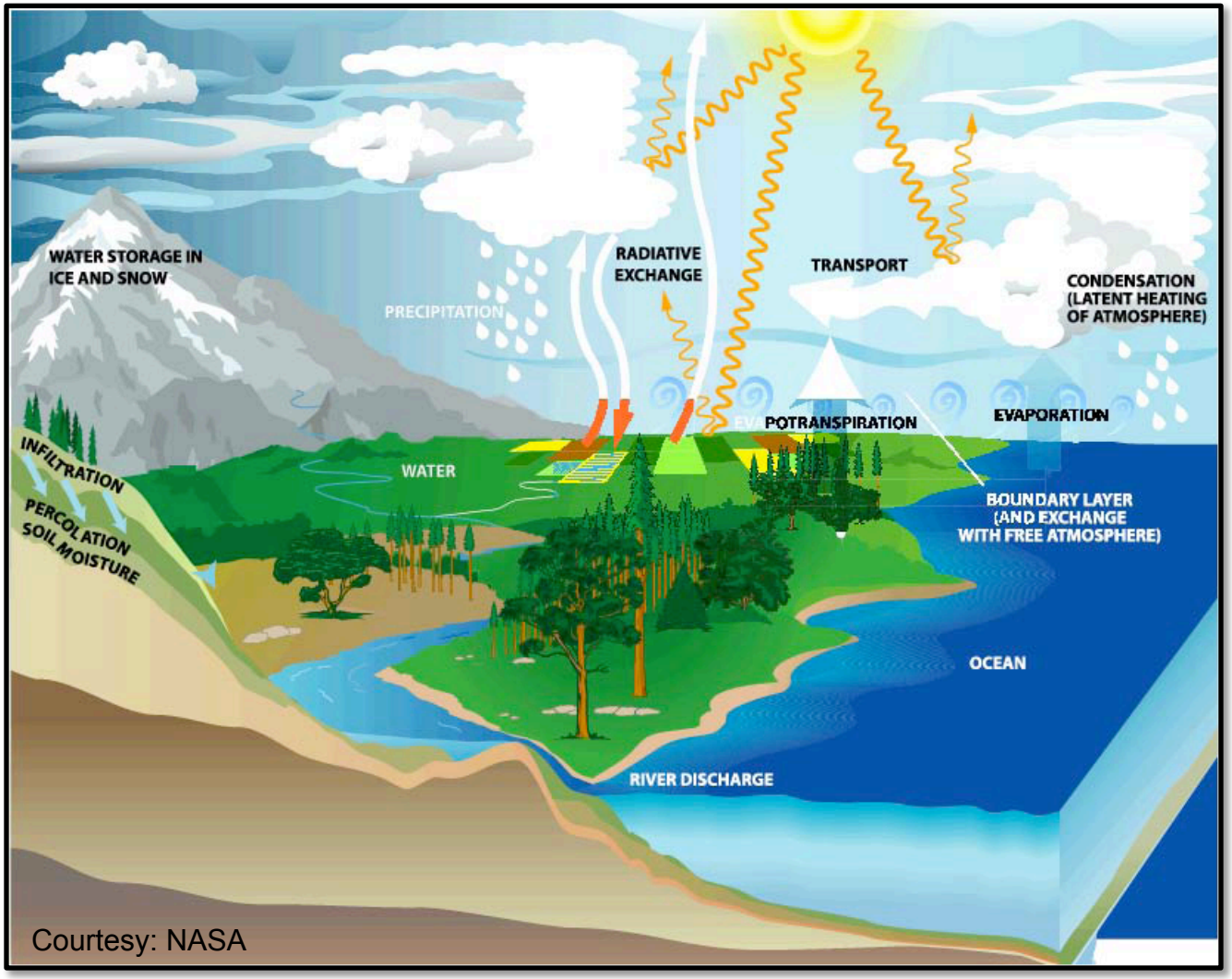
Appearing in Journals:

- Monthly Weather Review
- J. Hydrometeorology
- J. Atmos. & Oceanic Tech.
- Bull. Amer. Meteor. Soc.
- Geophys. Res. Let.
- *Proc. Institution of Civil Engineers* – Water Resource Res.
- Weather & Forecasting
- IEEE Trans. on Geosci. & Rem. Sens.
- J. Appl. Meteor. & Climatology
- J. Climate
- Nonlin. Proc. in Geophys.
- Prog. in Oceanography
- Water Management

Lead authors represent:

- NOAA ESRL PSD
- NOAA ESRL GSD
- NOAA NSSL
- NOAA NWS NCEP
- NCAR/Societal Impacts Program
- USGS
- CIRES/University of Colorado
- CIRA/Colorado State University
- Naval Postgraduate School
- University of Washington
- Universit`a di Torino, Torino, Italy
- Contributing authors represent an additional 10 or more institutions

HMT is about Producing the "Best Possible" Hydrologic Forcings



Courtesy: NASA

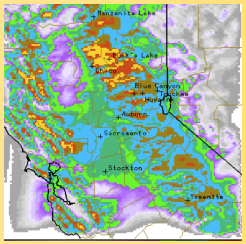
HMT Major Activity Areas

QPE: *Quantitative Precipitation Estimates*

- QPE Challenges for HMT-West (D. Kingsmill)
- WSR-88D radar QPE for the HMT-West: Methodology, results, and future plans (J. Zhang)
- MPE-PRISM analysis (R. Cifelli)

QPF: *Quantitative Precipitation Forecasts*

- DET-HMT Linkages (Z. Toth)
- Ensemble modeling status (I. Jankov) Reforecasting (T. Gallarneau)
- DTC Verification (E. Tollerud)
- Extreme precipitation performance measure (E. Sukovitch)



HMT Major Activity Areas

SI: *Snow Information*

- Performance measure for snow level & Next Steps (A. White)
- Current forecast capabilities snow level and hydrologic applications (A. Henkel)

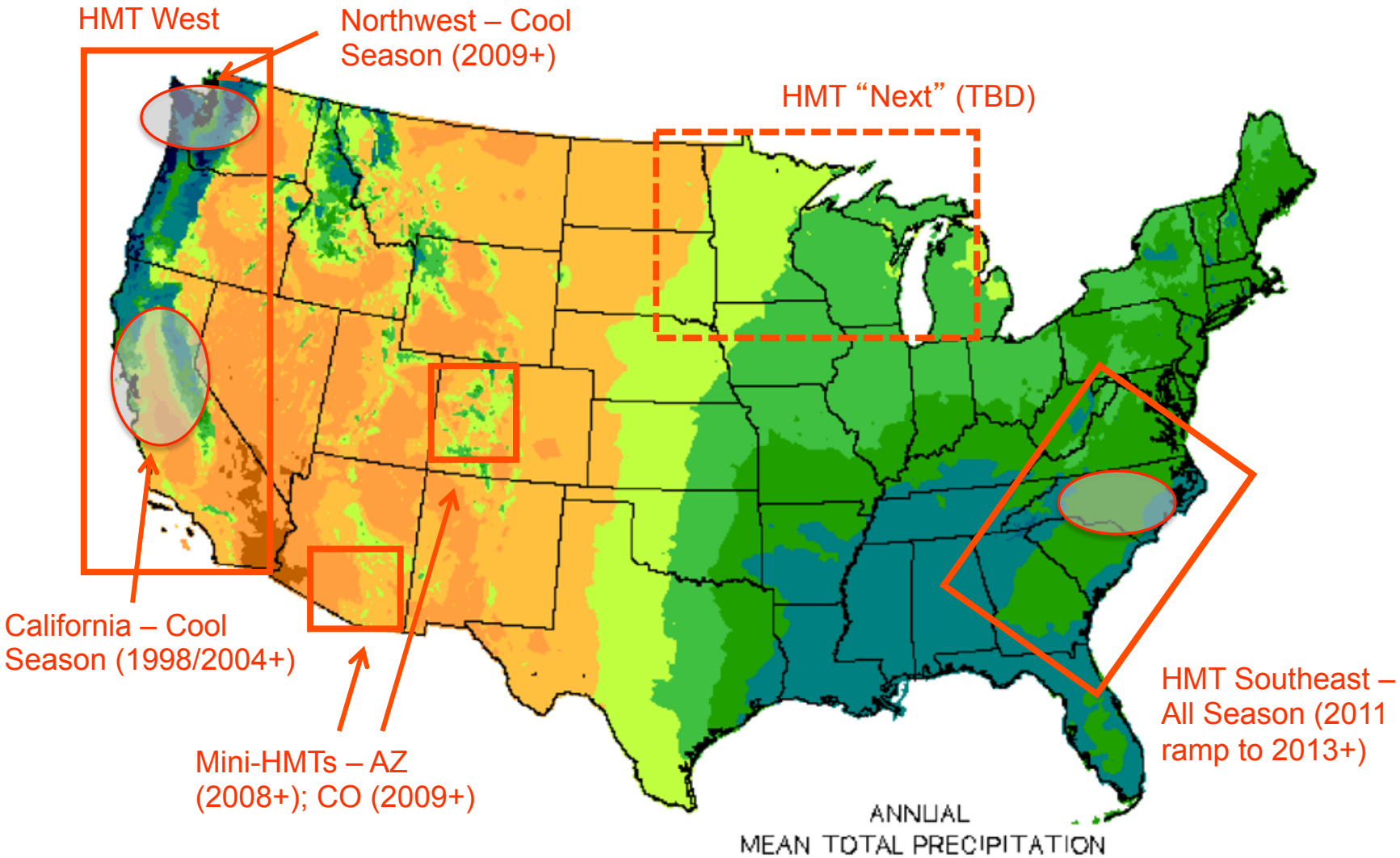
DSTs: *Decision Support Tools*

- ALPS – Implications for AWIPS II (W. Roberts)
- Flux tool & LAPS (P. Neiman)
- Atmospheric River Identification and Forecasting – Improved situational awareness (D. Reynolds) erformance

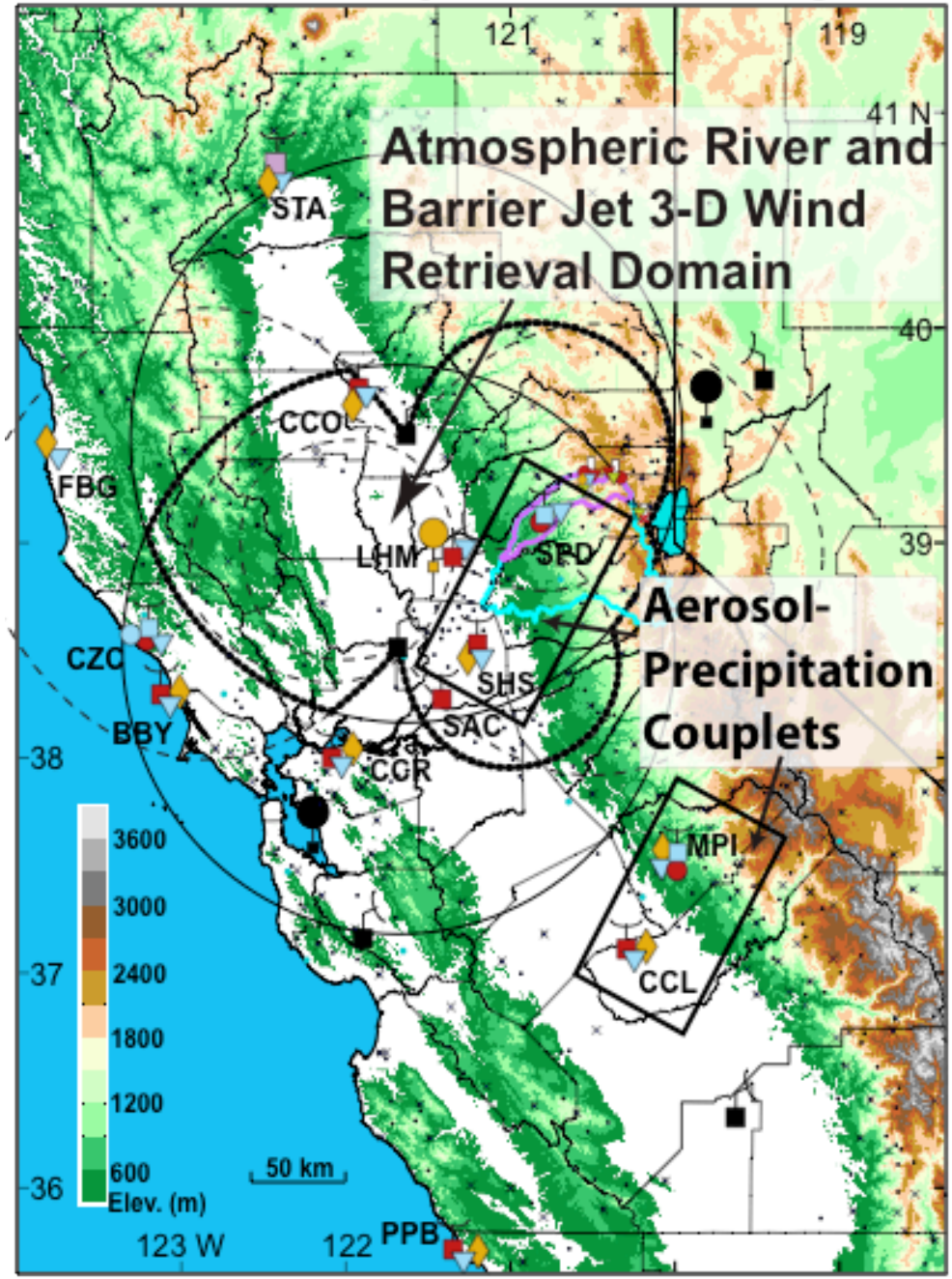
HA/SP: *Hydrologic Applications & Surface Processes*

- DMIP2 (M. Smith)
- Soil moisture status (B. Zamora)
- WRF-Hydro simulation effort (L. Johnson)

A National Testbed Strategy



CalWater and Key HMT Observing Sites - Winter 2010/11



ESRL C-band Doppler Radar (SKYWATER)

3-D Multiple Doppler wind retrieval domain

915 MHz Profiler

GPS IWV

S-band Profiler

Impact (JW) Disdrometer

Optical (Parsivel) Disdrometer

S-band FMCW Profiler

Sfc Met & TB Precip Gauge

Hot Plate Precip Gauge

ETI Precip Gauge

Snow Depth

Operational & Long-Term Observing Systems

NWS WSR-88D

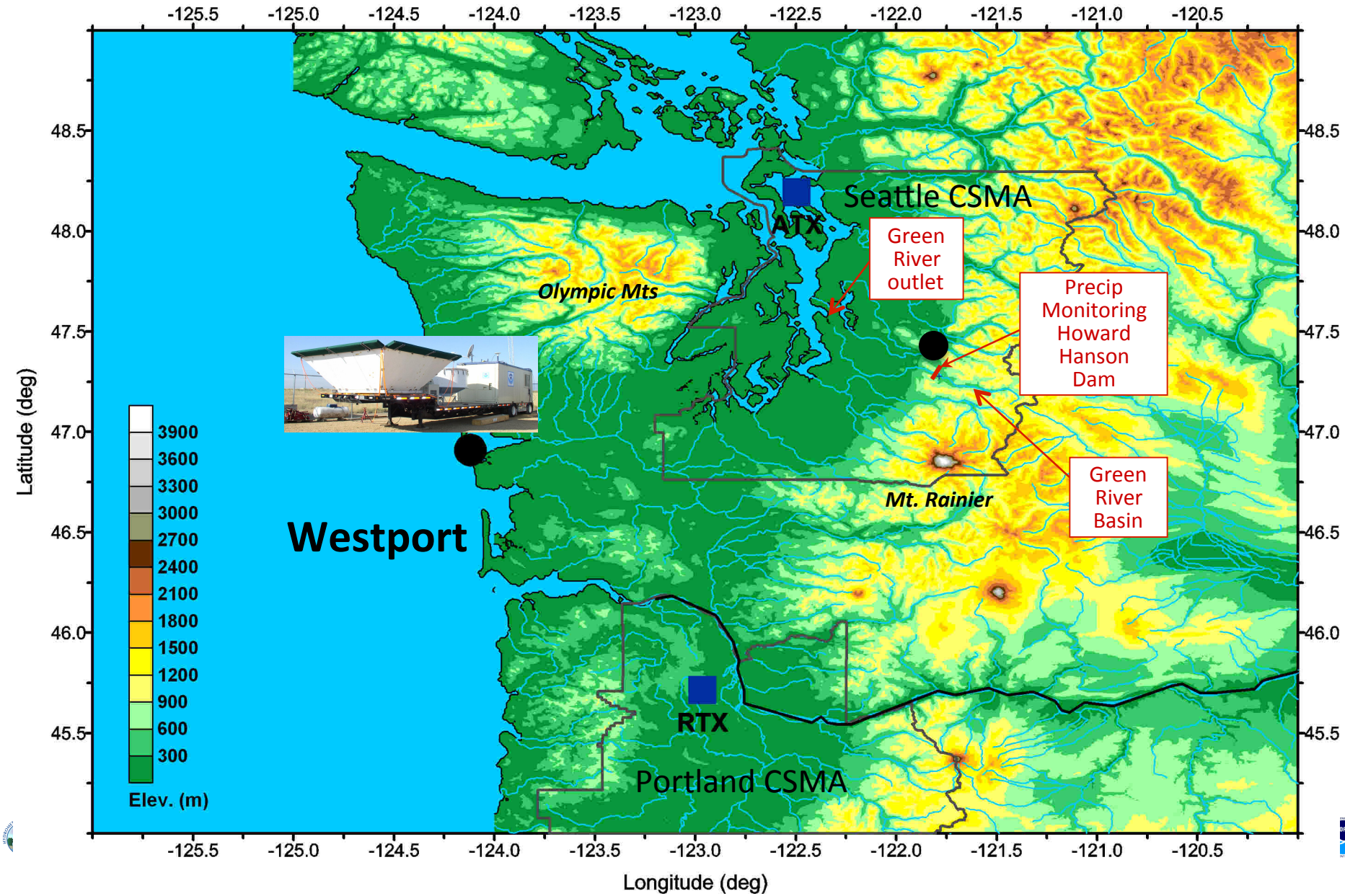
NWS Rawinsonde

BBY, CCO; CCL:
Since 1998

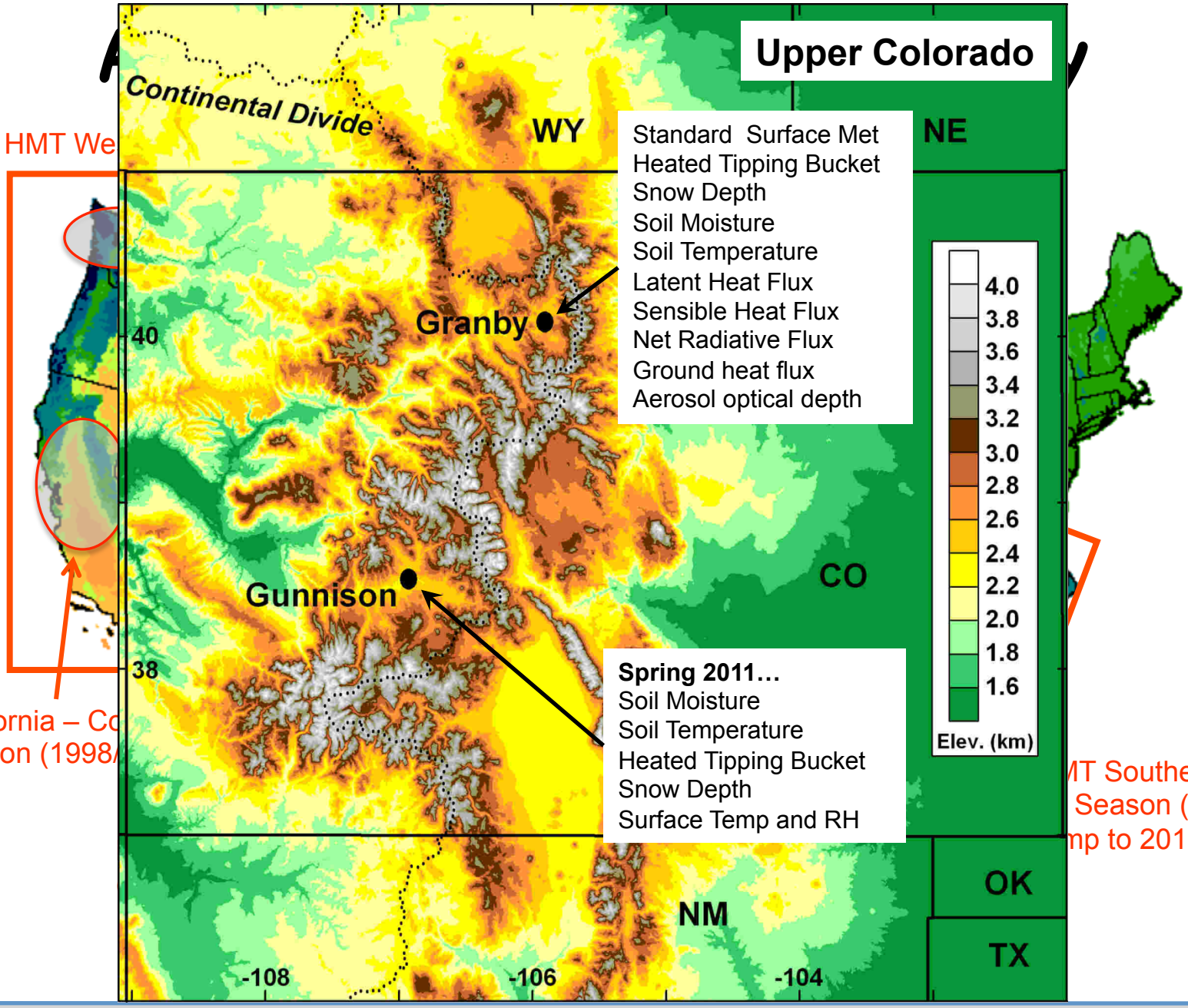
CZD:
Since 2001 (1998)

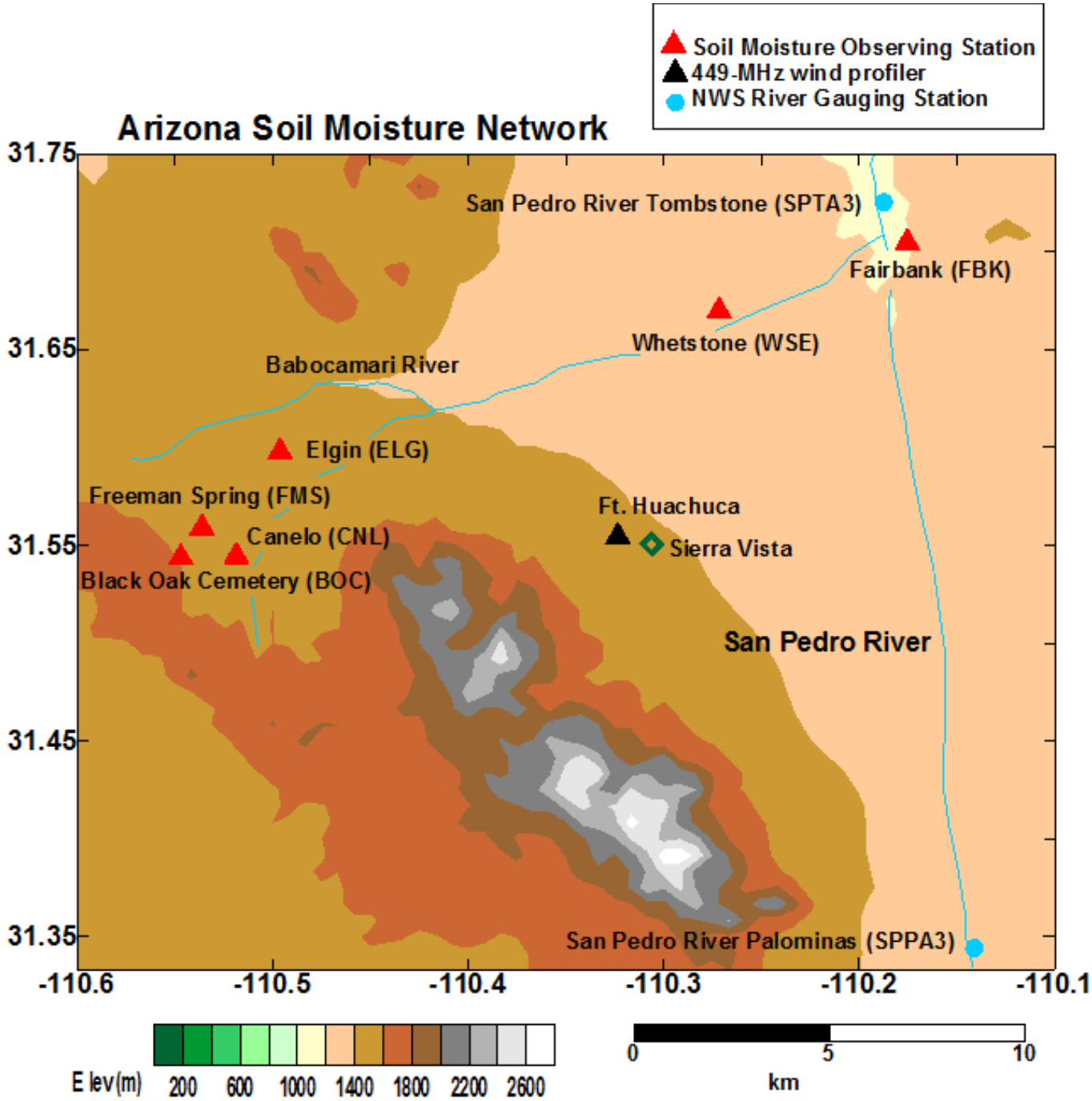
BLU:
Since 2004

Washington Mobile Atmospheric River Monitoring System Deployment – 1 Nov/09



Upper Colorado





Calif
Seas

east –
(2011
3+)

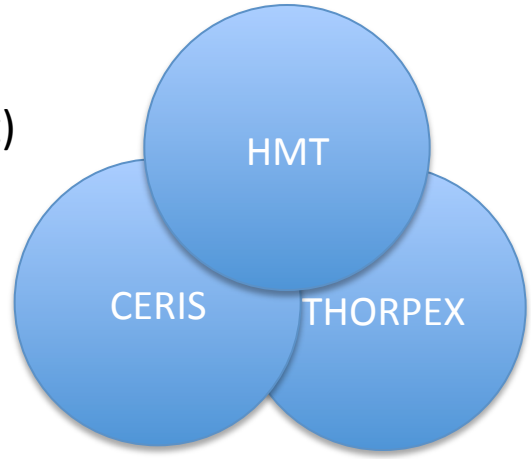
HMT-SE Update

- New challenge for HMT – all seasons
  - *Warm season focus,* but…
  - Land-falling tropical (named) storms
  - Cool season phenomena
- Geographic scope:
  - Initial efforts centered on the Piedmont in NC (*see map*)
- Priorities & Requirements
  - HMT is driven by NOAA priorities
  - Workshops identified ~47 requirements
- Coordinate with
  - SE-CART
  - Water Center/IWRSS
  - CERIS
  - CI-FLOW & Sea Grant
  - Coastal Services Center
  - NIDIS SE Pilot
  - NASA GPM-2013

HMT-SE Update

Milestones

- Ad hoc Workshop Planning Committee formed in 2008
  - HMT-SE Operational Needs & Requirements Workshop, February 2009
  - HMT-SE Research Planning Workshop, June, 2009
- *President's Budget 2011 Budget Request:
  - HMT (base support for hydromet research)
  - CERIS (coupling estuary and river models in the Southeast)
  - THORPEX (large-scale QPF modeling and assimilation)
- Guiding documents are currently under development
  - An HMT-SE science plan (drawing on diverse group from NOAA and stakeholders)
  - An HMT-SE implementation plan
- Tentatively*: begin ramping up in NC in 2011
  - pending Congressional approval of the budget



HMT-SE Update

- Nature & scope of observations:
  - Profiling sites
  - Surface sites
  - Scanning radar
  - Mobile balloon systems
- Nature & scope of modeling:
  - Regional
  - Large scale
  - Coupled systems

American River Basin

~1830 mi^2

North Fork: ~338 mi^2

Cool Season (Nov-Mar)

Tar-Pamlico River Basin

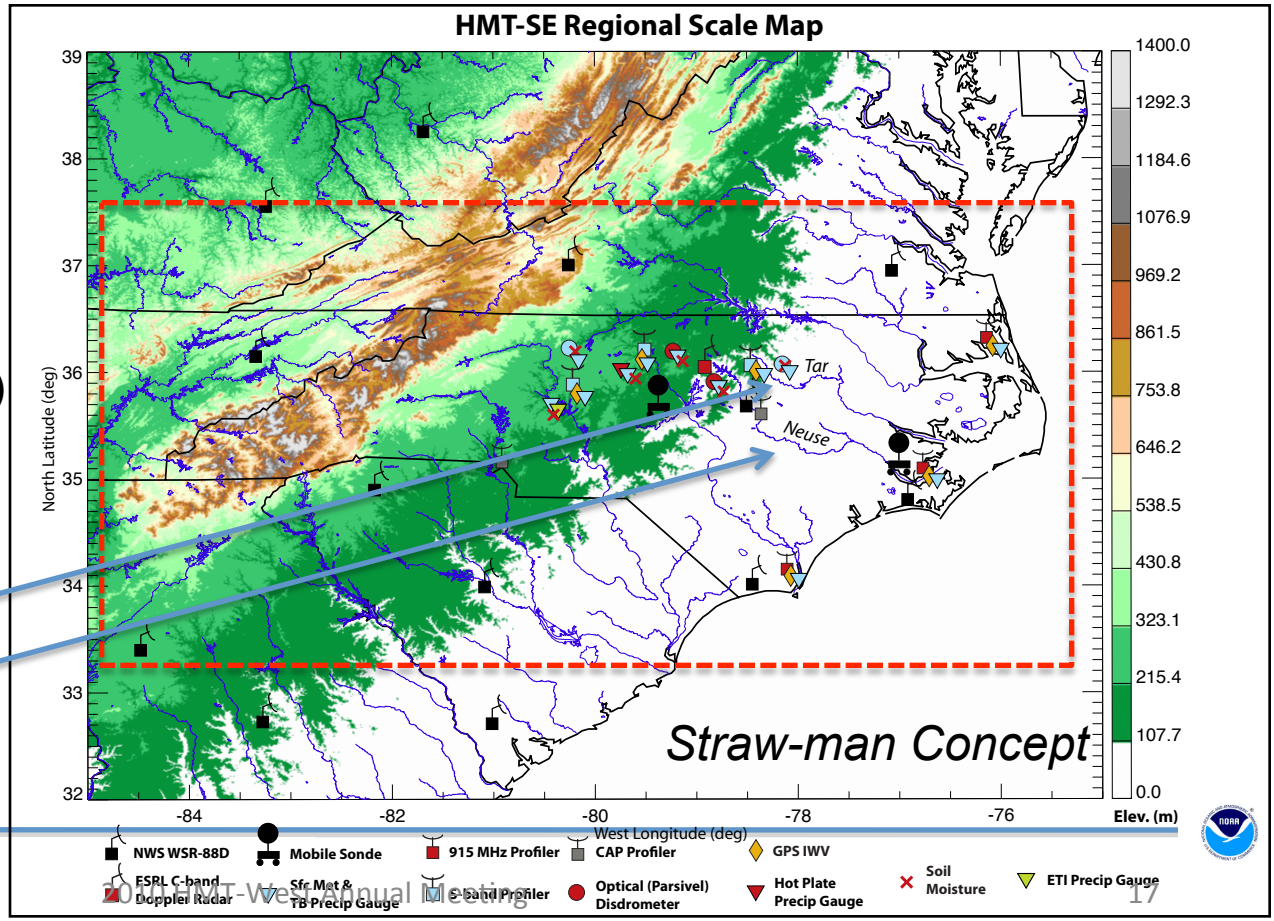
~5375 mi^2

All season

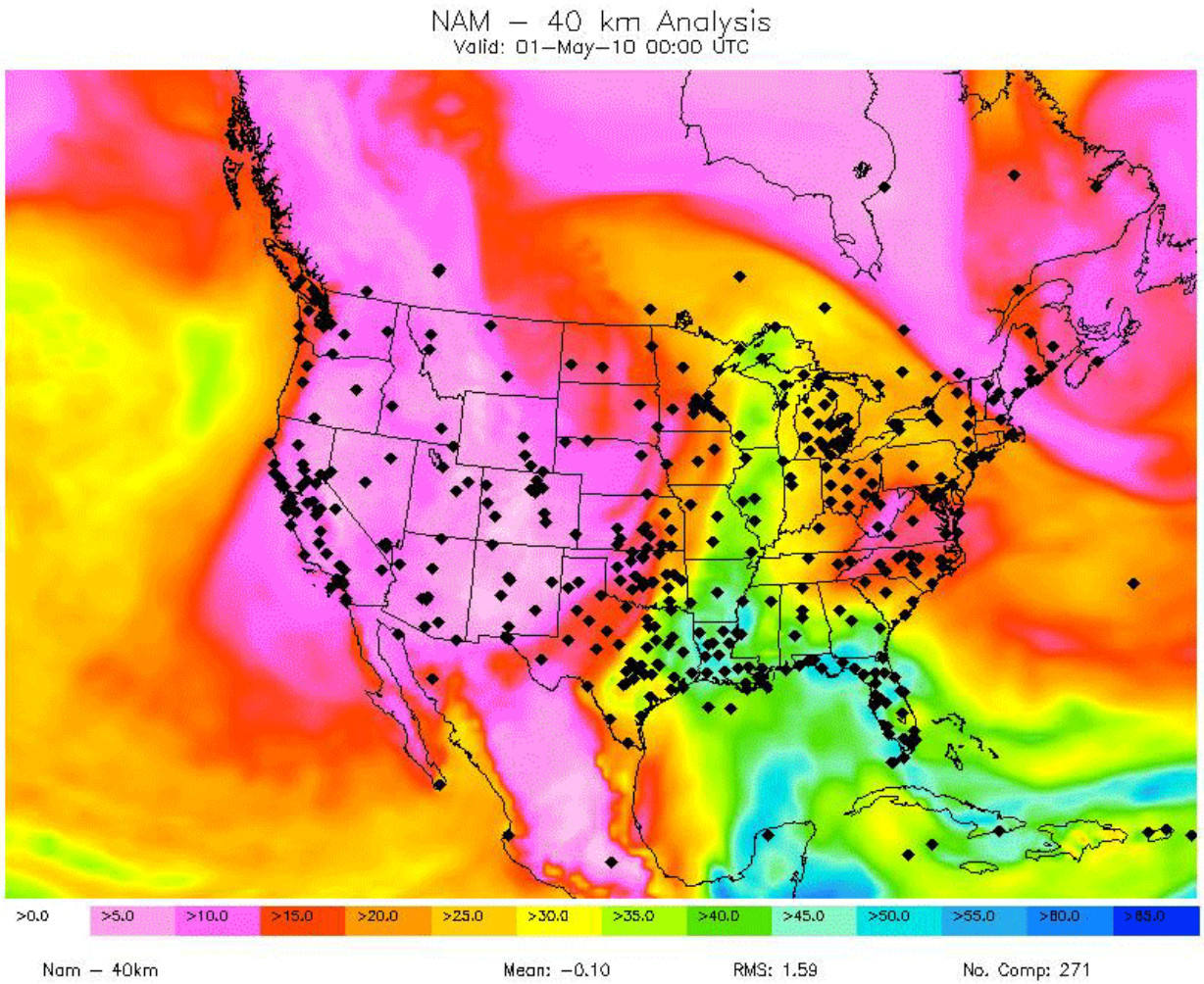
Neuse River Basin

~6225 mi^2

All season



Thank You!



Slide: Courtesy of Seth Gutman