HMT modeling activities

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for

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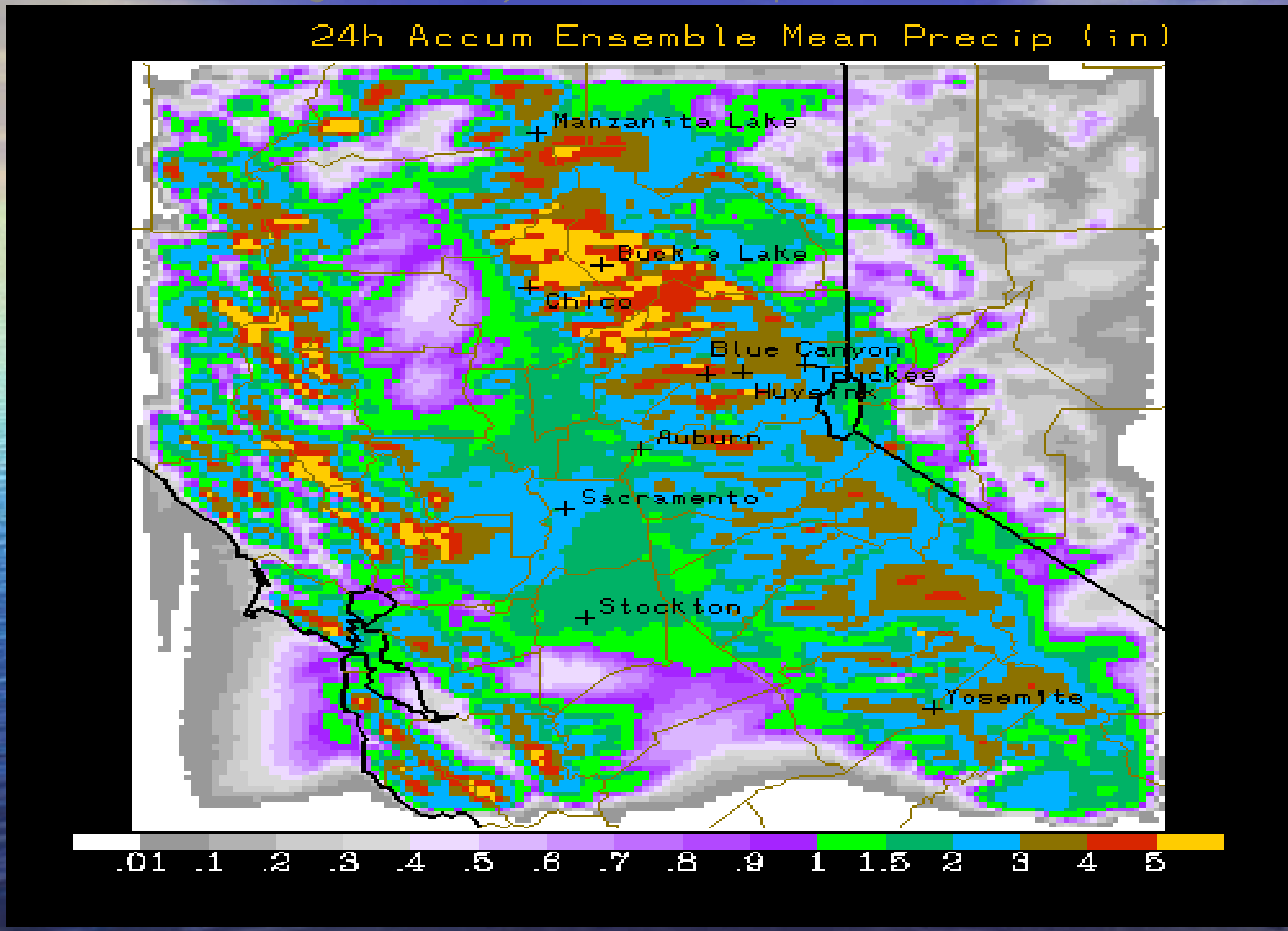
ESRL theme presentation

November 6, 2008

Ensemble Mean Precipitation Forecast 4-5 Jan 2008 00GMT (24 hr forecast ending 5/00GMT): Most intense period

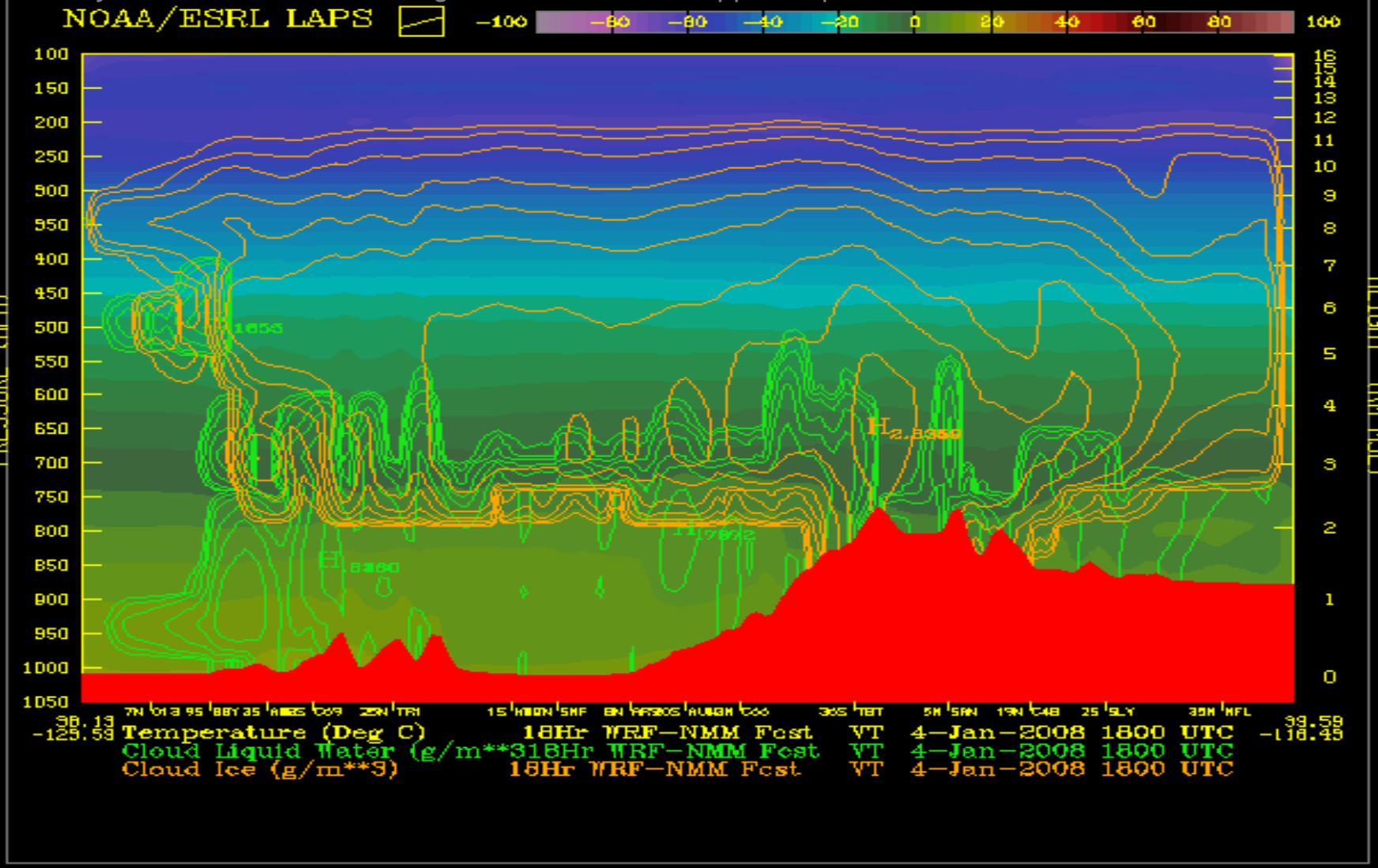


Predicted Precip in ARB Area: Most Intense Period

Station	Forecast	Obs	Error
Alta	3.00	3.33	-.33
Big Bend	3.95	4.25	-.30
Blue Canyon	4.00	M	
Canada Hill	3.90	1.61	+2.29
Colfax	2.82	1.86	+.96
Forrest Hill	2.80	2.54	+.26
Greek Store	2.52	2.56	-.04
Huysink	3.20	3.42	-.22
Norden	3.40	3.63	-.23
Onion Creek	3.15	3.83	-.68
Slough House		M	
Talbot	3.00	3.00	0
Truckee	2.10	2.12	-.02

Bias + 0.15 RMS 0.80

WRF-NMM cross-section along ARB axis just prior to heaviest rain: solid colors, temperature (< 0C is darkest green); orange contours - cloud ice (g/m^3); green contours cloud water (g/m^3). Melting level clearly seen, with snow reaching the surface on the upper slopes.



Published results

Yuan, H., J.A. McGinley, P. Schultz, C.J. Anderson, and C. Lu, 2008: Short-Range Precipitation Forecasts from Time-lagged Multimodel Ensembles during the HMT-West-2006 Campaign. *J. Hydrometeor.* 7, 477-491.

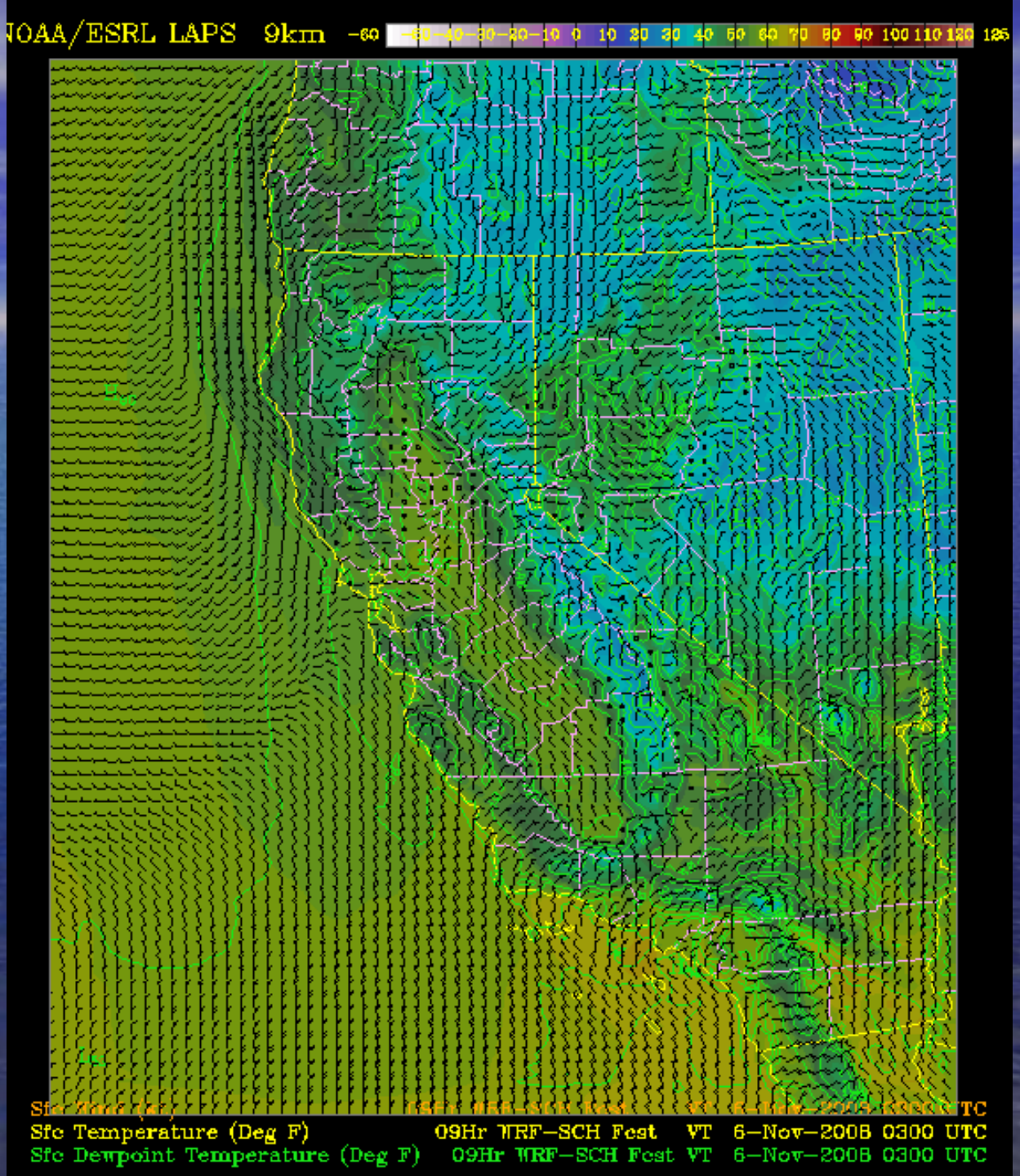
Jankov, I., P. Schultz, C.J. Anderson, and S.E. Koch, 2007: The impact of different physical parameterizations and their interactions on cold season QPF in the American River Basin. *J. Hydrometeor.* 8, 1141-1151.

Jankov, I., Bao, J.-W., P.J. Neiman, P. Schultz, H. Yuan, and A.B. White, 2008: Evaluation and comparison of microphysical algorithms in WRF-ARW model simulations of atmospheric river events affecting the California coast. *J. Hydrometeor.* In press.

New for this winter

- Migration to CA/DWR focus shifts emphasis to the RFC problem
  - Less useful for WFOs
  - Larger domain, out to 120 hrs
  - Lower spatial, temporal resolution
    - Δx = 9 km, was 4 km
    - Output every 3 hrs, was 1 hr
  - Four WRF v3 models run every 3 hrs
    - 3 microphysics variations of ARW, plus 1 NMM
    - Time-lagging to enlarge ensemble
    - LAPS initialization, GFS lateral boundaries

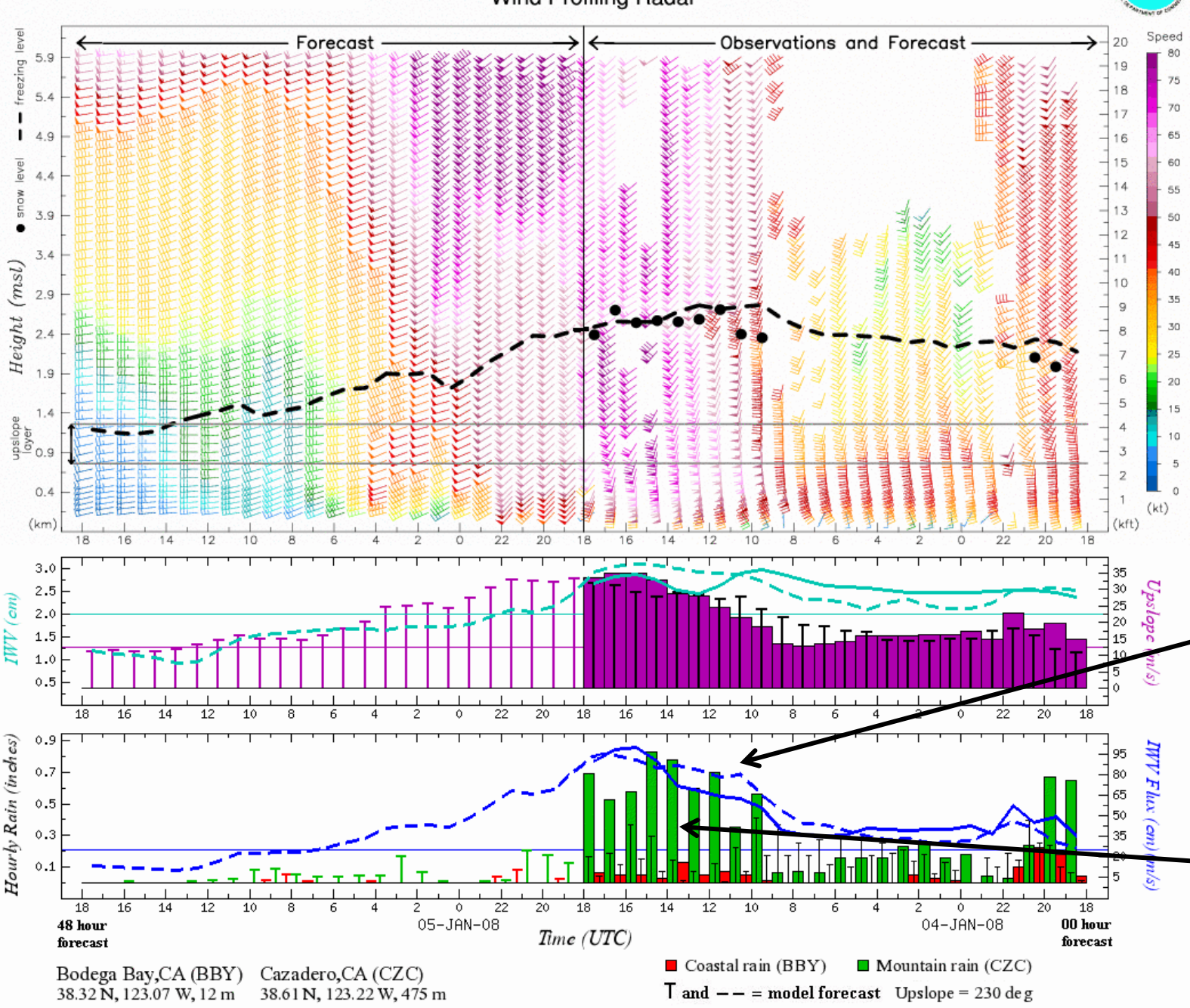
The new domain



Plus, a separate high-res run to compare to PSD's moisture flux forecasting tool

- Similar domain size as the other runs
- Higher horizontal grid spacing (5 km)
- Hourly update
- 12-18 hrs forecast
- *LAPS initial conditions* radars, satellite, mesonets, profilers, GPS …
- GFS/RUC boundary conditions

Bulk Water Vapor Flux Observation and Model Intercomparison Prototype



O-forcing predicted well in this portion of the AR...

...but not the QPF, esp. in AR conditions

GFE's Advanced Linux Prototype Workstation (ALPS)

- Installed in CNRFC, 3 WFOs
  - Reno, Monterey, Sacramento, maybe Eureka
- Working with NWS on key developments
  - Grid push/pull, compression
  - Display of explicit precip, high-res "local" model data
  - Displays *and manipulation* of probabilistic QPF
    - Ability to load GFE

Connections

- HMT provided to GSD the opportunity to implement/test PQPF methods (Yuan) and ensemble design methods (Jankov)
  - Earned an invitiation to work with NCEP on developing NAEFS*-based prob guidance
- HMT gave GSD credibility to NWS planners of probabilistic forecasting (NFUSE†)
  - New project in NWS, good planning momentum
  - Workstation capabilities exposed to forecaster workshop
  - HMT forecast offices can try them too

* North American Ensemble Forecast System

† NOAA Forecast Uncertainty Steering team

More connections

- Service Delivery Proving Ground
  - Well-funded (in plans) activities at select forecast offices to vet new products with producers (forecasters) and users
  - HMT = SDPG for probabilistic forecasts
    - New products: probabilistic QPF, others coming
    - Select forecast offices: HMT cooperators
    - Users: Folsom Dam operators
- New collaboration with OHD (J Schaake)
  - Model QPF postprocessing
    - Hydrologists call it QPF *pre*processing
    - Averaging and bias correction appropriate to a practical range of time/space scales
    - Inputs to runoff models
    - National implementation

EFREP Tiered Modeling Effort (0-5 days)