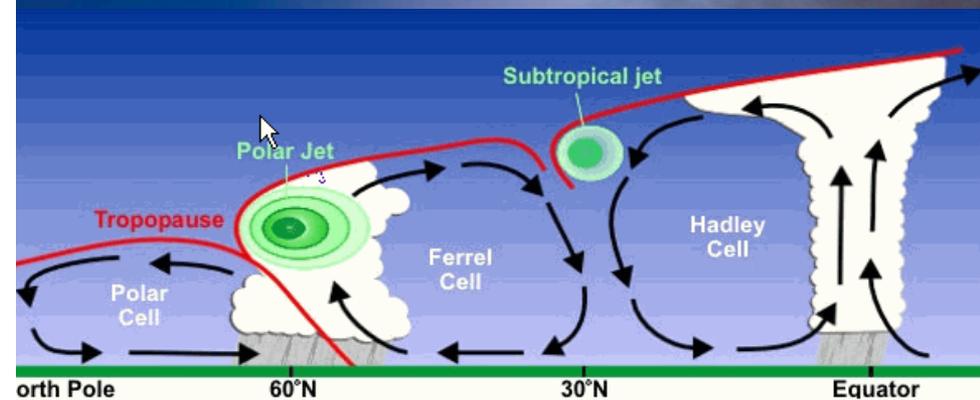
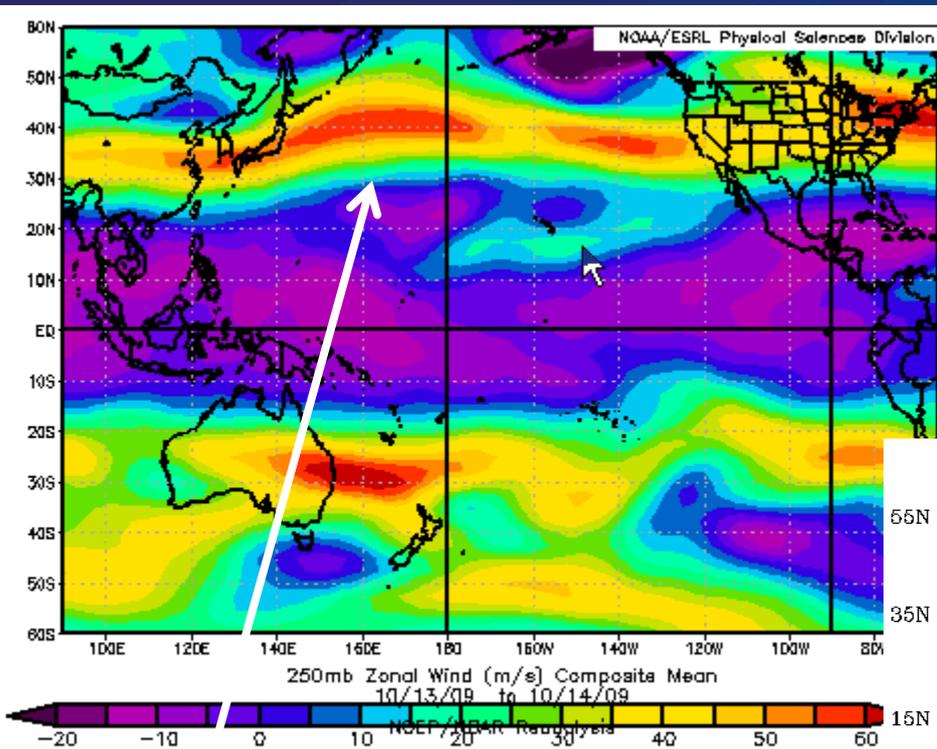


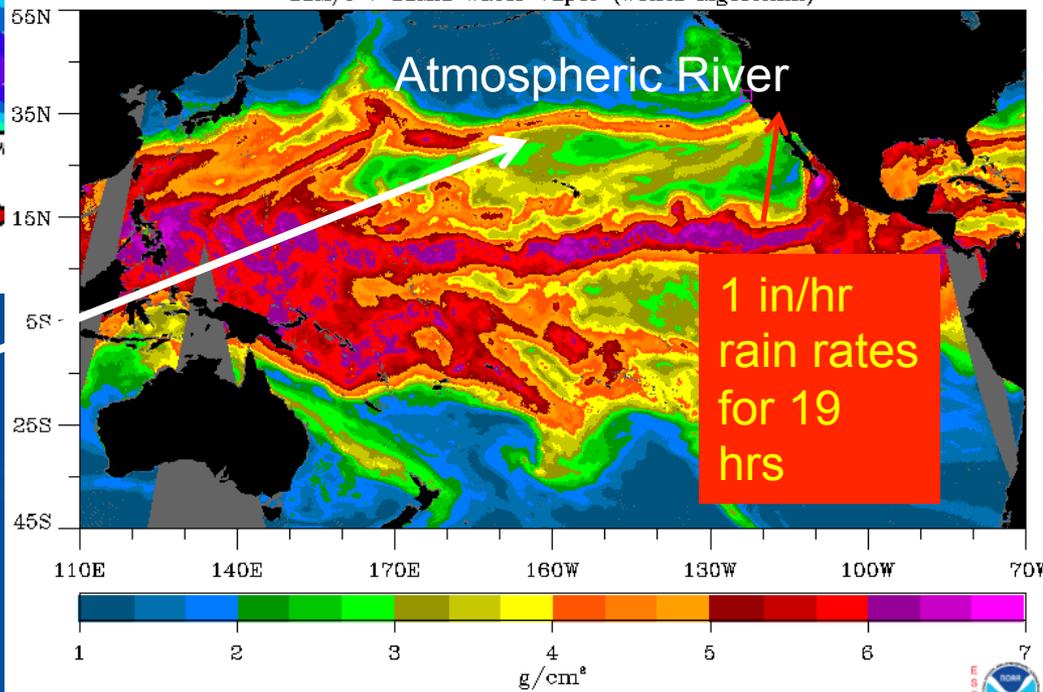
Coastal NWS Office Assessment of HMT West

- Main goal of HMT –
 - **Original** - Improve QPE and QPF for hydrologic modeling and thus improve flood forecasting – lead time – peak flow and duration etc.
 - **Current**- Identify gaps in current measurement systems/forecast guidance that limit improving QPE/QPF for hydrologic modeling/flood forecasting.
 - Develop conceptual models of processes leading to flooding
 - Develop decision support tools to aid forecaster use of observations and modeling.

Key Result - Atmospheric Rivers are a main contributor to flooding in CA



October 14, 2009 1000 UTC Preceding 12 Hours
SSM/I + SSMIS Water Vapor (Wentz algorithm)



Extended East-Asian Jet

Coastal NWS Office Assessment of HMT West

- QPE Assessment Coast Range –
 - Gap filling radars within flood prone regions of the coast range can provide improved monitoring of precipitation.
 - Ft. Ross and KPIX assessments have demonstrated this especially for shallow warm rain events.
 - Potential benefits much greater for improved flood forecasting in coast range than Sierra given HMT experience.

Key Results

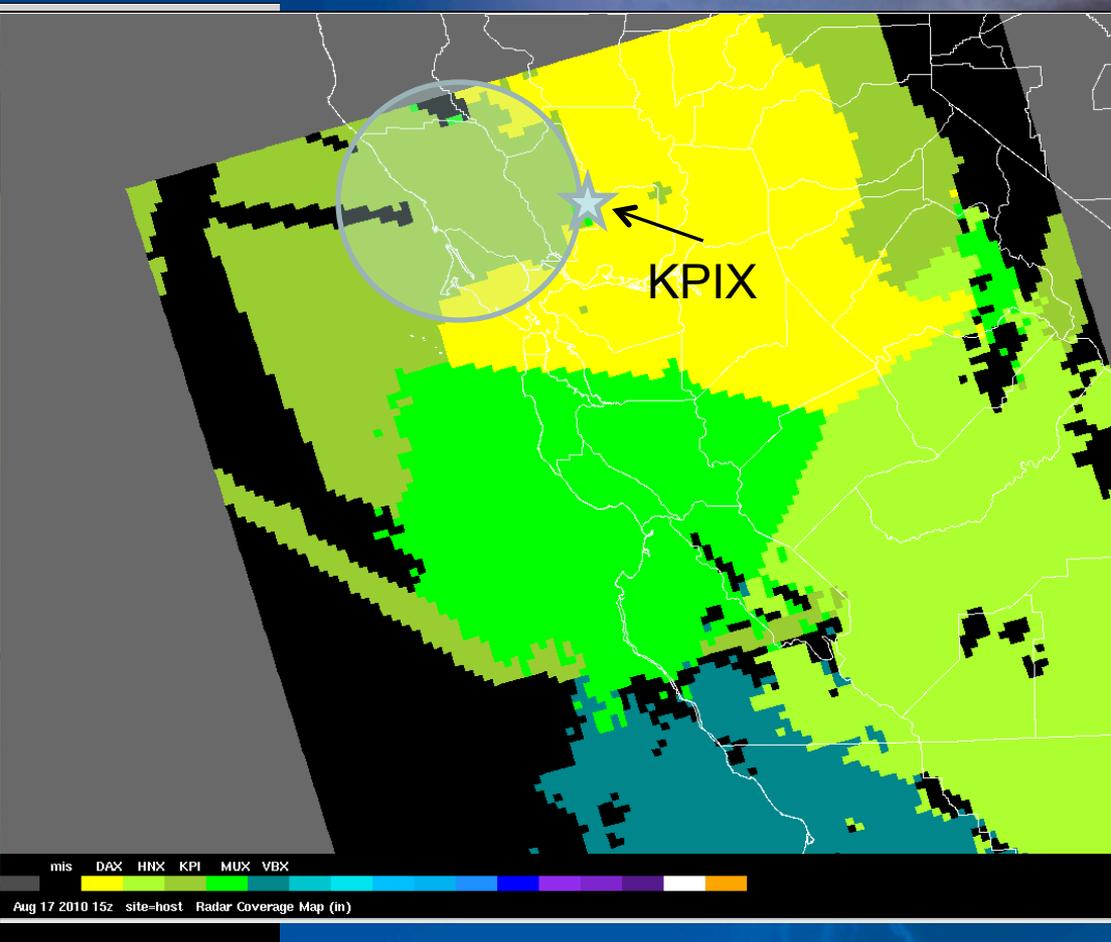
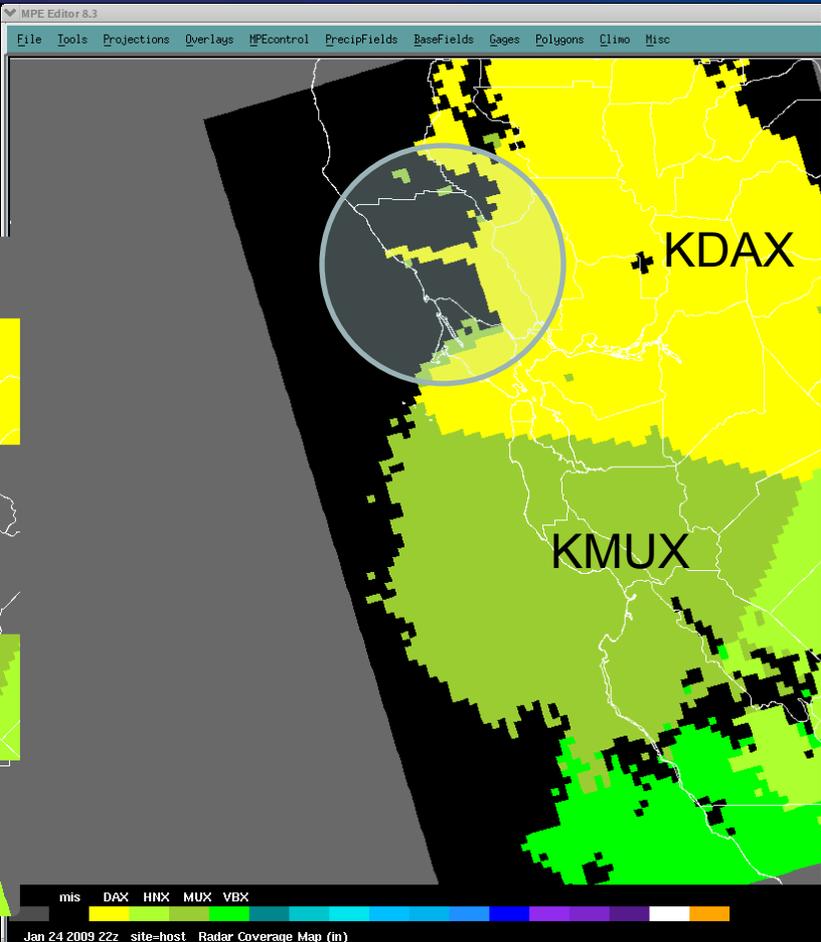
- Warm rain process can be a significant contributor to rainfall during land-falling ARs.
 - » Not sampled well if at all using current NEXRAD deployment.
 - » AR observatories have documented frequency and % of rainfall contributed from these cloud features.
 - » Gap-filling radars or additional gages needed to improve QPE and short-term QPF? Rob Cifelli will discuss.
- Recommend configuration of MPE software at all WFO's to assess ability to bias correct NEXRAD rainrates and thus improve Flash Flood Monitoring and Prediction.

Radar Coverage

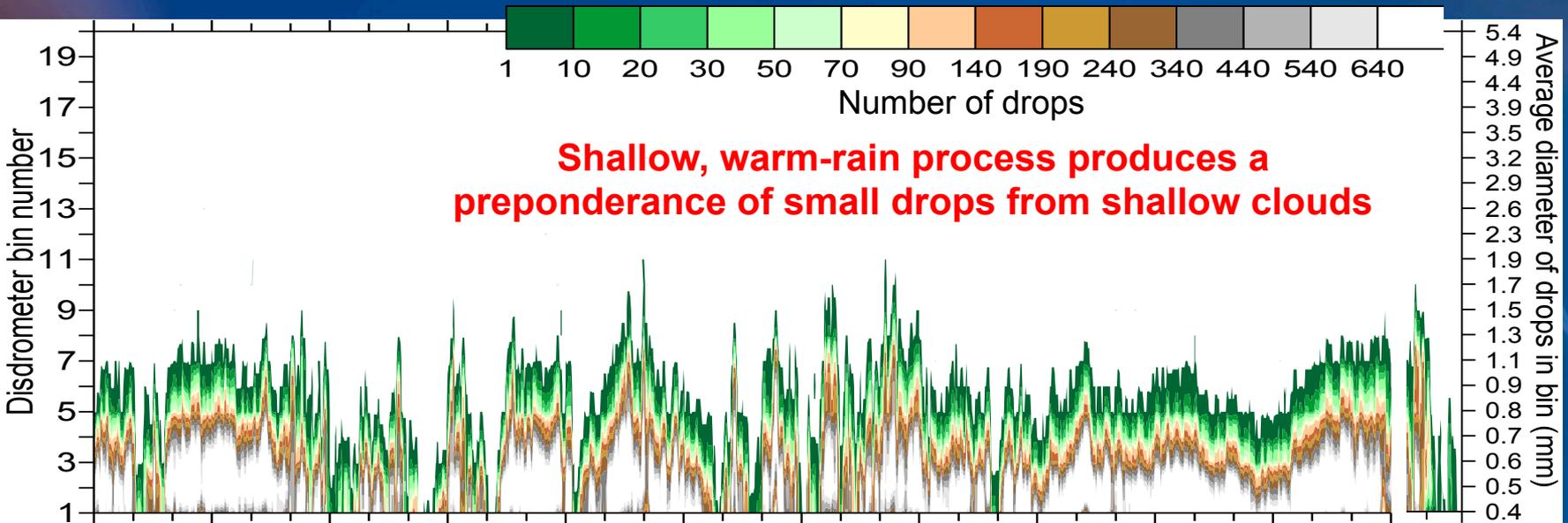
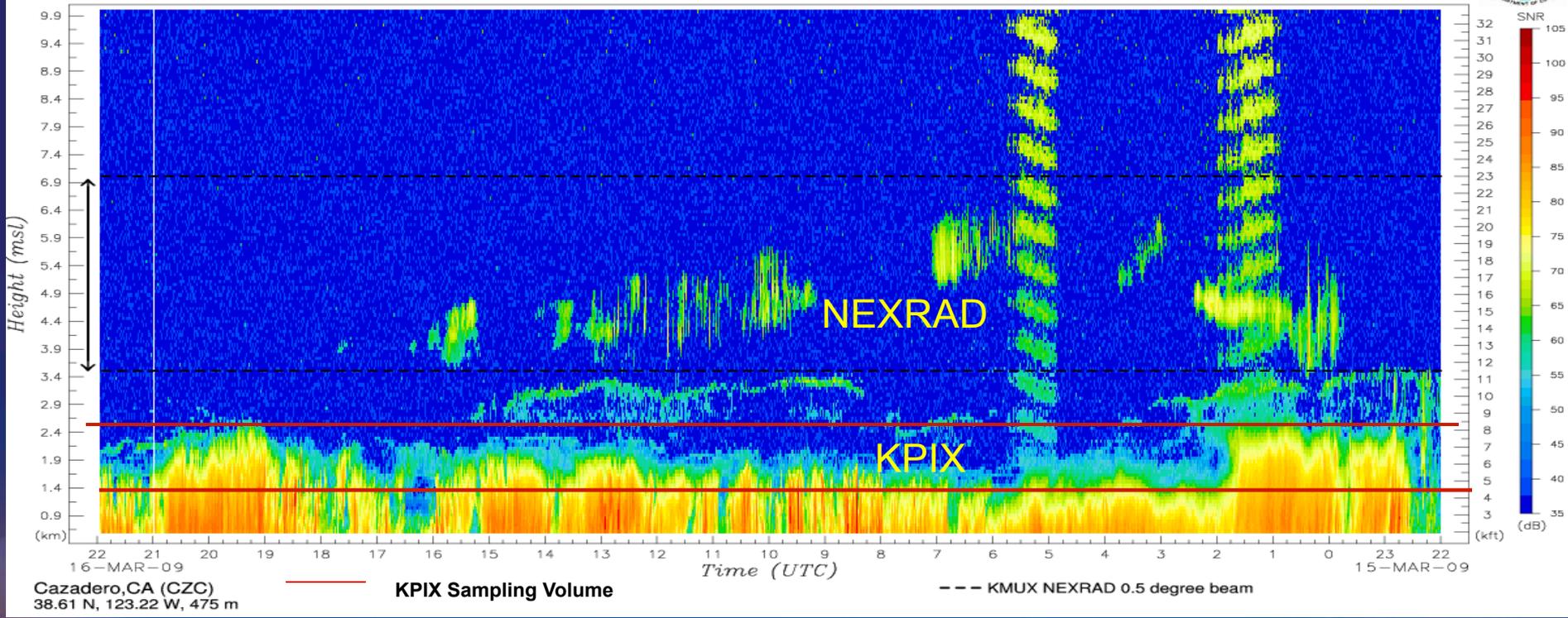
MPE – Multisensor Precipitation Estimator

NEXRAD Only

NEXRAD +KPIX



ESRL Physical Sciences Division
Precipitation Profiling Radar

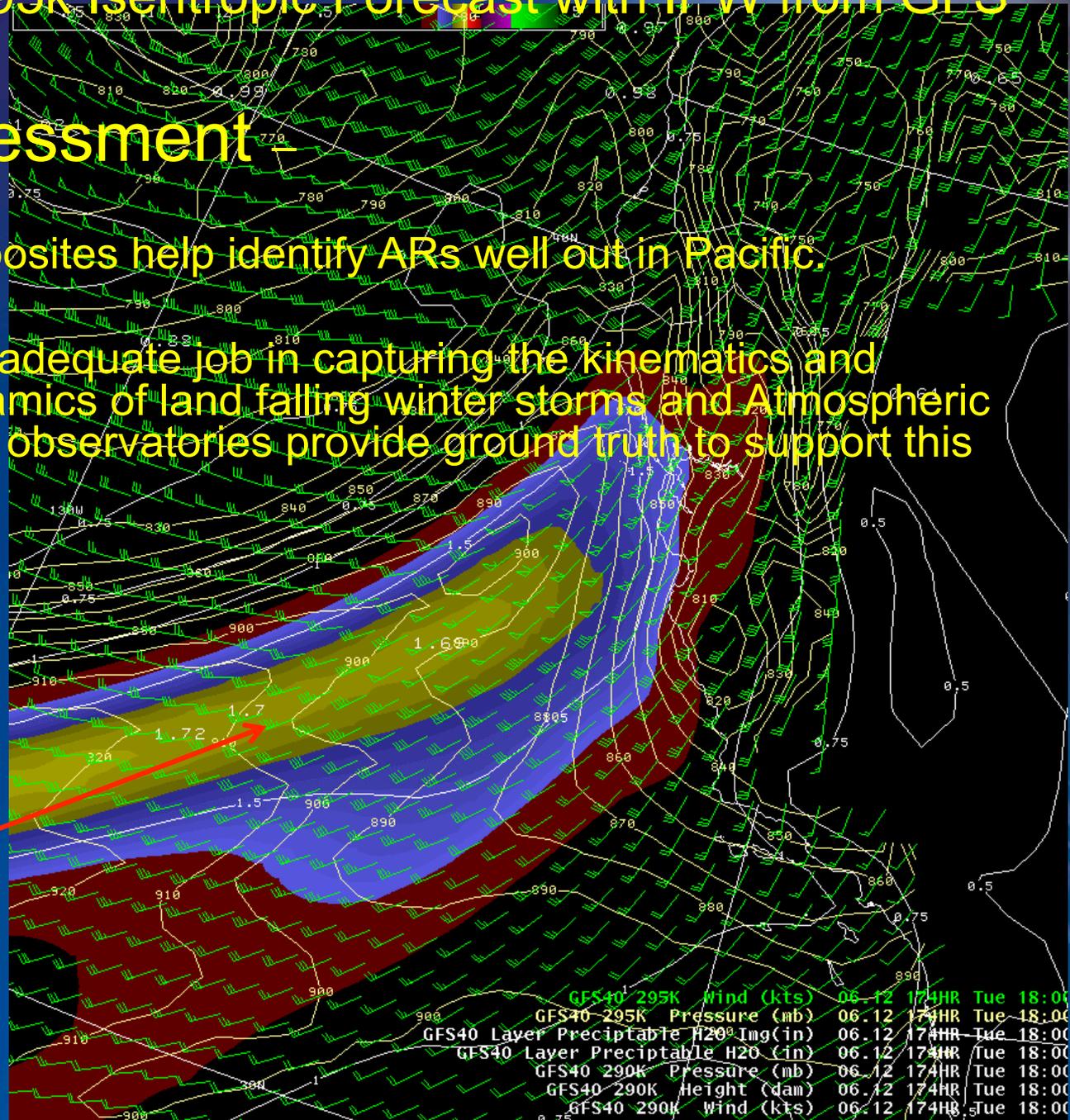
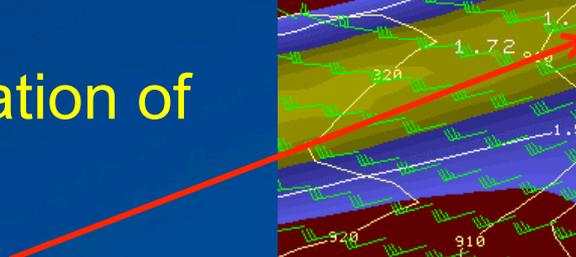


174 hr 295k Isentropic Forecast with IPW from GFS

- QPF Assessment

- SSM/I composites help identify ARs well out in Pacific.
- NWP does adequate job in capturing the kinematics and thermodynamics of land falling winter storms and Atmospheric Rivers. AR observatories provide ground truth to support this conclusion.

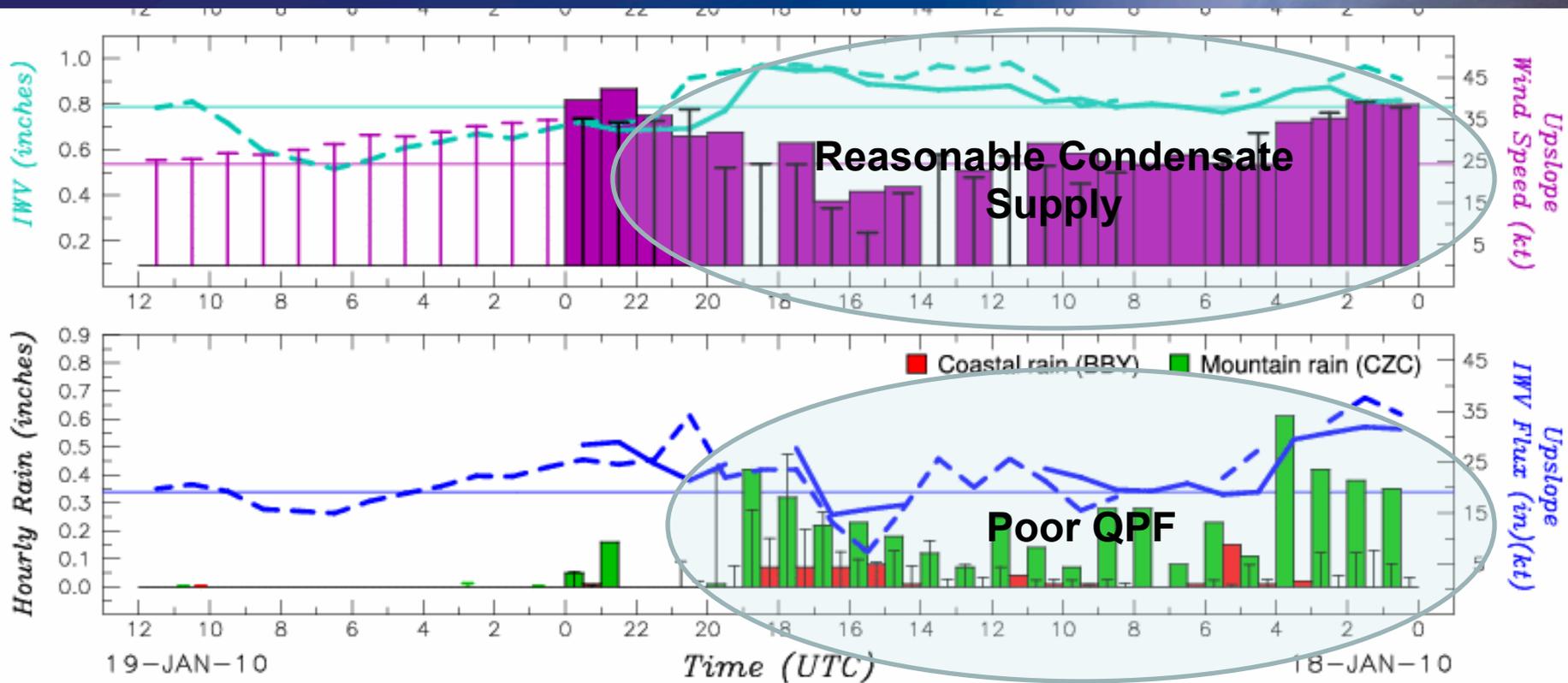
Model
representation of
AR



QPF Results- Gaps

- Weakest performance of NWP models is when strong orographic forcing is taking place and this is enhanced by vertical motions such as in frontal bands. Models not able to bring the condensate to the ground quickly enough i.e. precipitation process much more efficient than NWP is simulating.
 - This is well observed using new decision support tool that combines AR observatory observations with rapid update NWP modeling. Hourly model QPF updated hourly shows poor correlation to ground truth gage data.
- Timing and location of mesoscale forcing can be problematic. Model boundary initializations key component. Changing boundary conditions provide much more diverse solutions than changing model parameterizations. Better quantification of uncertainty.
 - Transitioned to GFS Ensemble members for boundary conditions.
- ALPS workstation - has proven that large data sets can be pushed to field sites. Without ALPS testing and development, NWS offices would not have been able to view high resolution ensemble output updated at 3-hr intervals in a timely fashion.

NWP versus Obs Sonoma County



Bodega Bay, CA (BBY)
38.32 N, 123.07 W, 12 m

Cazadero, CA (CZC)
38.61 N, 123.22 W, 475 m

Upslope Direction = 230 deg
T and -- = Model Forecast
Obs/Fcst Verification: 3 hours
Fcst Init: 18-JAN-10 23 UTC

BBY 24-hr obs precip: 0.56 in
CZC 24-hr obs precip: 4.98 in
BBY 12-hr fcst precip: 0.00 in
CZC 12-hr fcst precip: 0.02 in



Other Key Results

- AR Observatory - The transition from simple wind profiler sites to what are now called AR observatories with GPS IPW capability, S band vertically pointing radars, and disdrometers, provides a tremendous capability to monitor the key parameters needed to measure the magnitude of the AR and assess the physical processes taking place within the AR. In addition the real time display development (Flux Tool) of this information in a concise graphic combined with rapid update NWP output has led to a very useful and important potential operational product for NWS.
- Soil moisture sensors – Determined to be a critical observation from recent NRC report on mesoscale observation requirements, has been field tested in various locations both at the coast and in the Sierra. Can be monitored by forecasters to determine antecedent soil moisture conditions in watershed and especially degree of saturation. Aids in assessing quality of RFC Flash Flood Guidance.

NWS Office Assessment of HMT West

- Unmet expectations from HMT West –
 - Experimental Forecast Facility – Researchers and dedicated forecasters working together during events and post-event to learn and adapt current methods. Has restricted/limited R2O. Outcome of constrained budgets.
 - Frank and open discussion of expectations for R2O. What are the real time frames and what are the key issues that provide real opportunity for R2O. NWS budget time lines do not provide a realistic time frame for transitioning research such as HMT West to operations...especially when it comes to observation platforms and O&M.
 - Realistic to think of 10 year time horizons.