# ETL and HMT: Activities in QPE,QPF and Physical Process Understanding

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# ETL Observing System Contributions

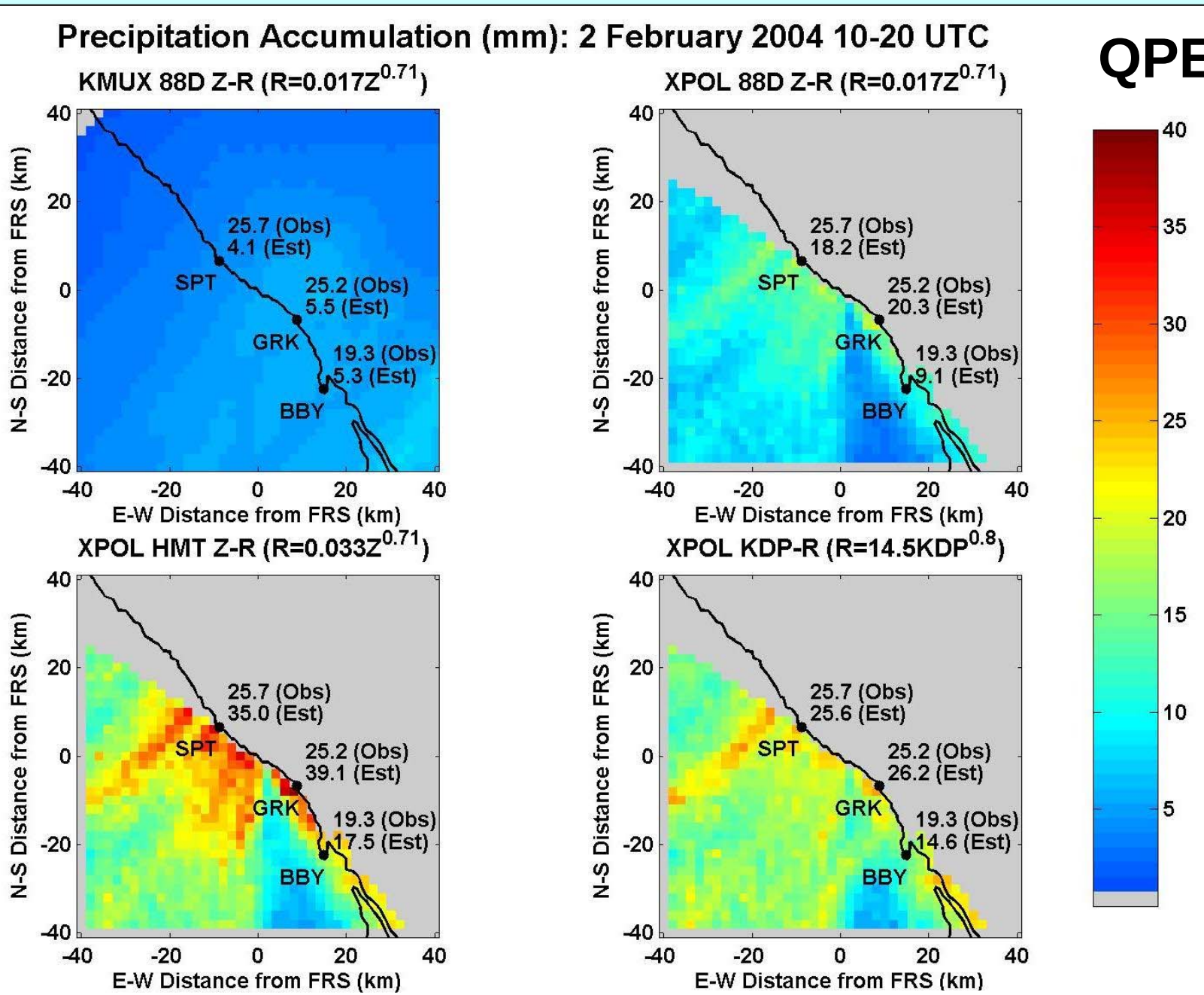
## Ground-Based

- 915 MHz Profilers
- 449 MHz Profilers
- GPS Integrated Water Vapor (with FSL)
- GPS Balloon Sounding
- S-band Profilers
- Precipitation Disdrometers
- Scanning X-band Polarimetric Doppler Radar
- Scanning C-band Doppler Radar
- Surface Meteorology, including Precipitation Gauges
- Soil Moisture Sensors

## Airborne

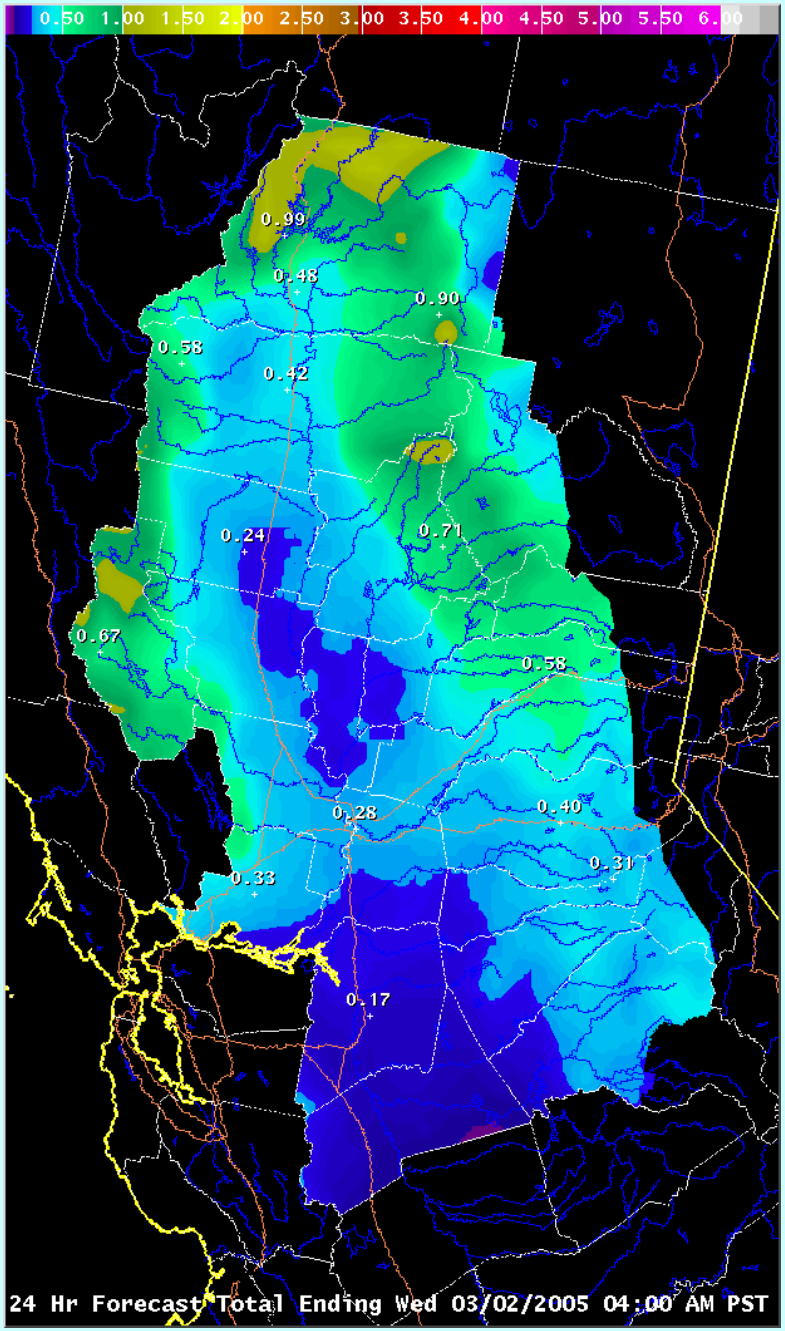
- Polarimetric Scanning Radiometers
- Optical Array Probe (2DC)

# Fort Ross, CA Instrumentation

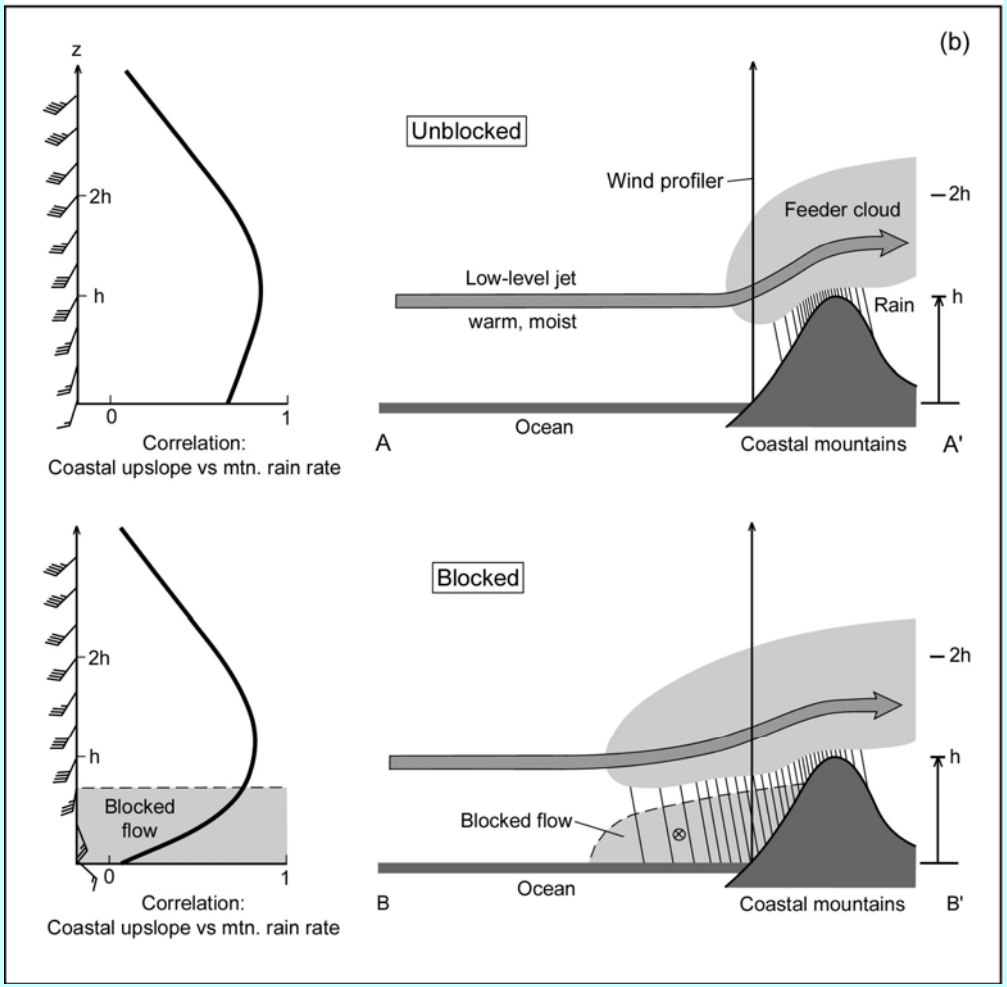



*Matrosov et al (2005), J. Hydromet.*

# Mountain Mapper QPF Output




# Relationship Between Upslope Flow and Precipitation




*Neiman et al (2002), MWR*

**Program Links**

HMT Home Page
Contact Us

**Initialization**

0:00
12:00

**Site**

Select a site:

- Astoria, OR
- Bodega Bay, CA
- Chowchilla, CA
- Chico, CA
- Cloverdale, CA (model only)
- Cazadero, CA (model only)
- Fort Ross, CA (model only)
- Grass Valley, CA
- Healdsburg (model only)
- Hopland (model only)
- Lost Hills, CA
- Pt Piedras Blancas, CA
- Rio Nido (model only)
- San Nicolas Is, CA

**Date**

< January 2004 >

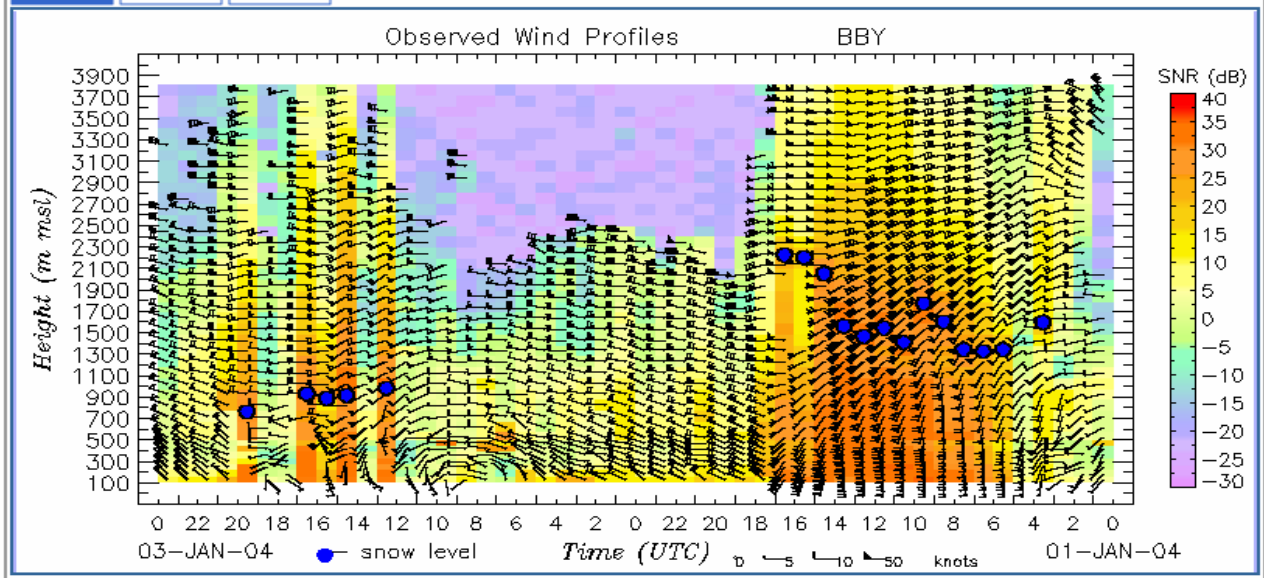
| Sun | Mon | Tue | Wed | Thu | Fri | Sat |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

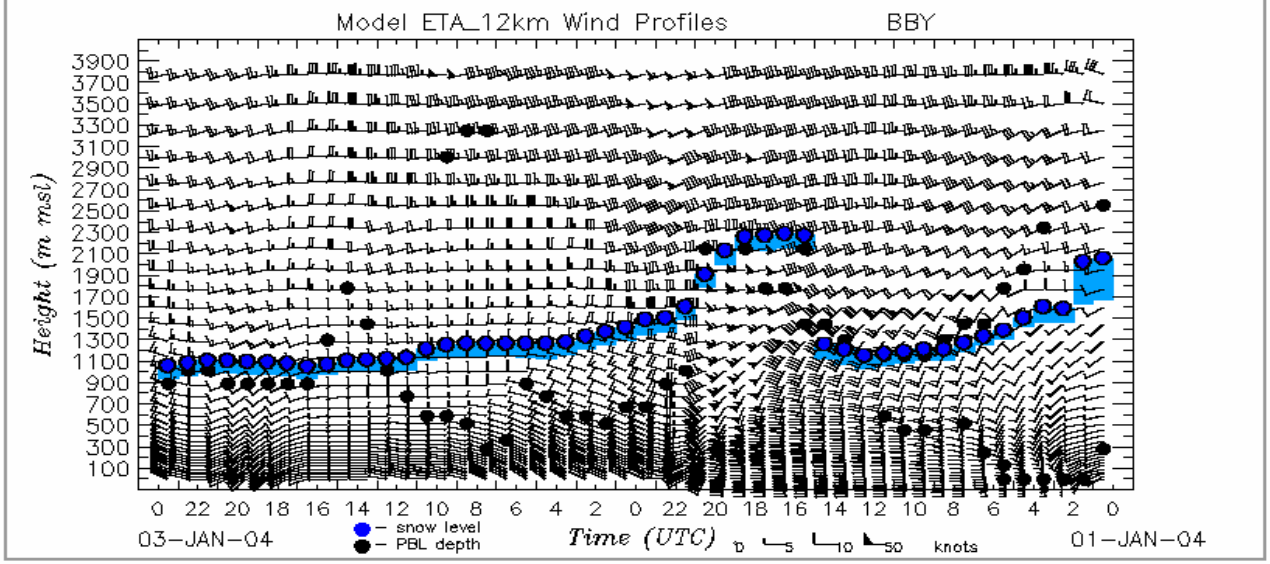
**Data Status**

Preliminary Data - Not to be used for Intercomparisons.

ETA-12 | GFS-50 | NMM-8 | RUC-20

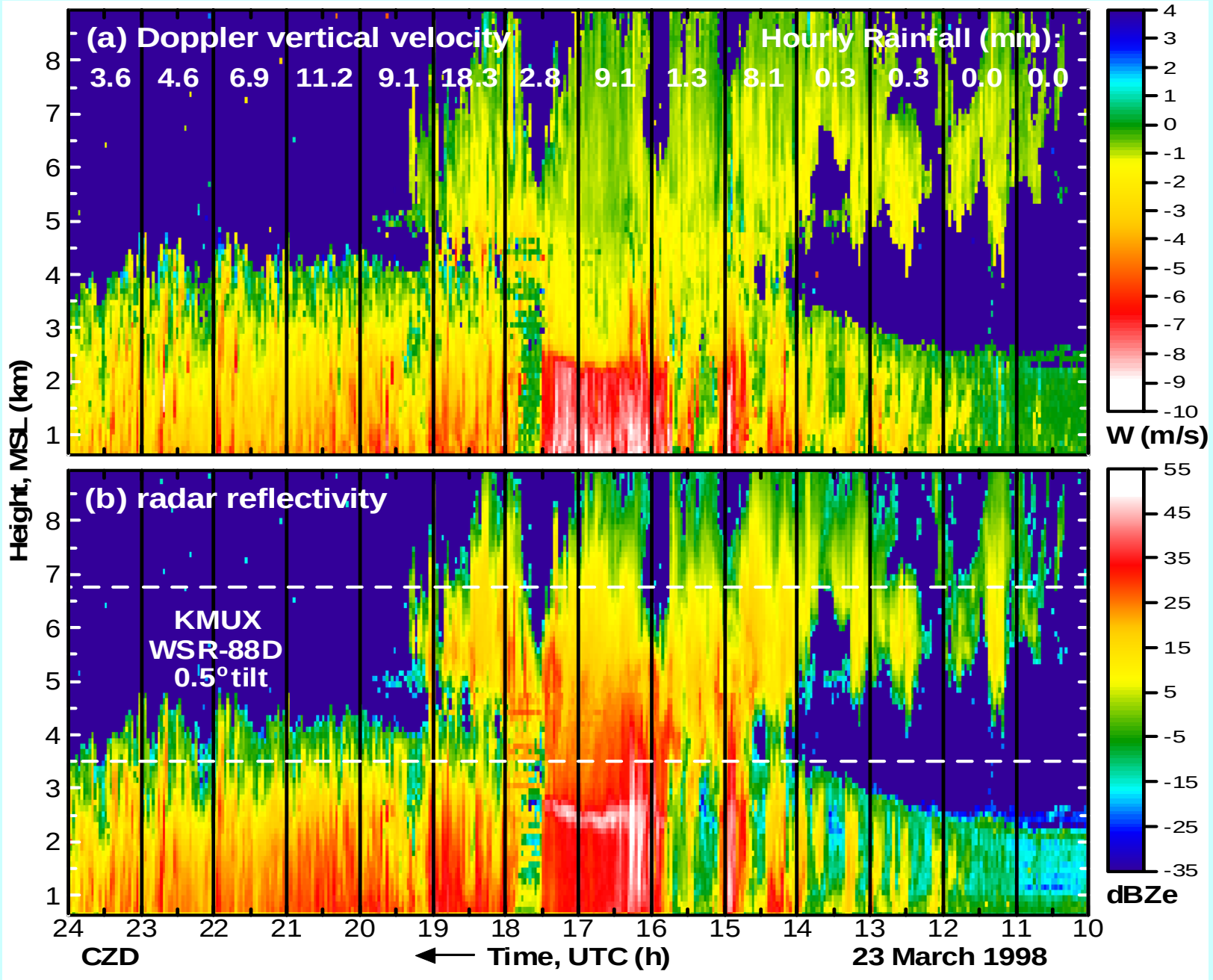
SNR/Winds | RASS/Winds | Sfc Met



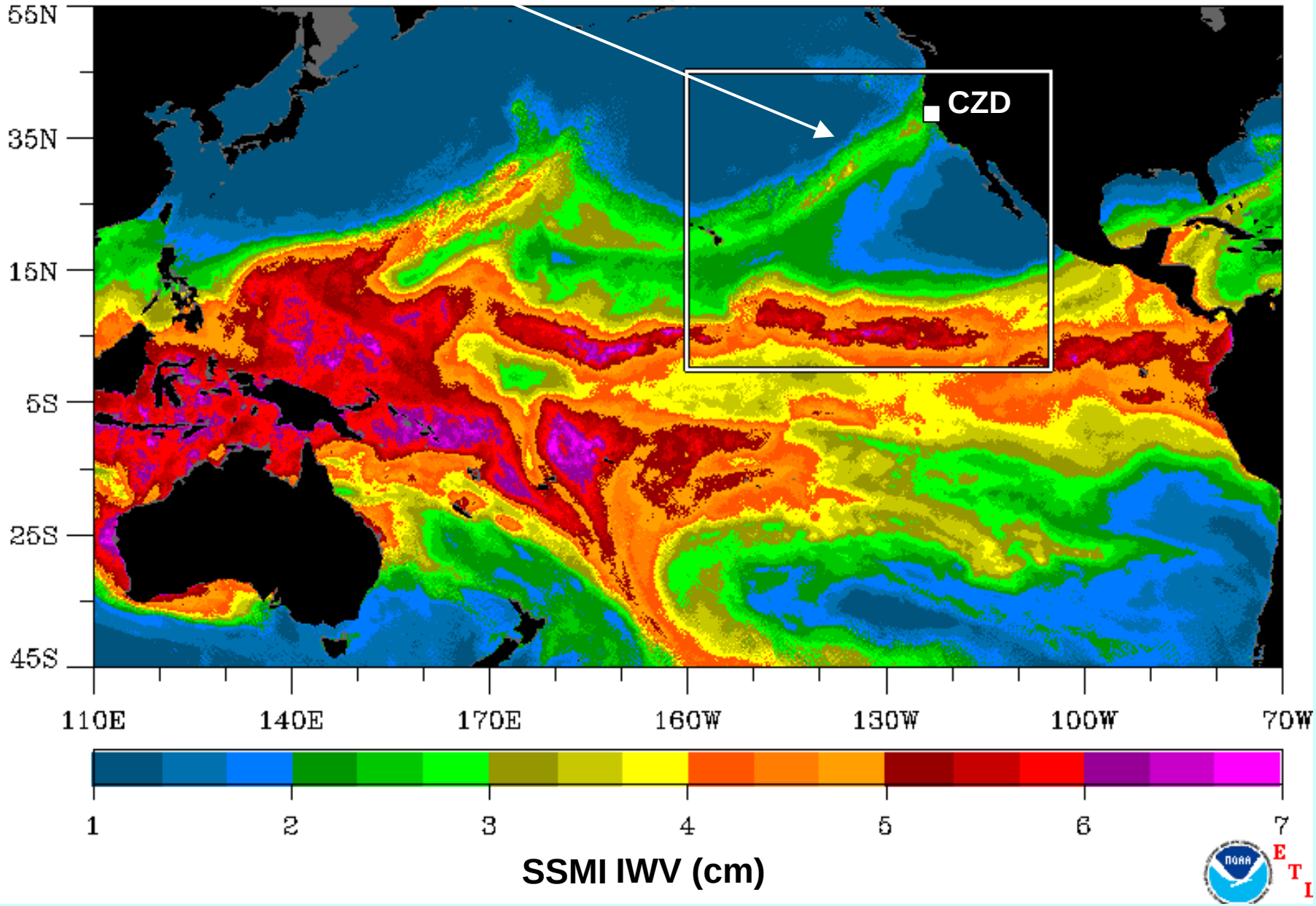




javascript:changeDate('04001')

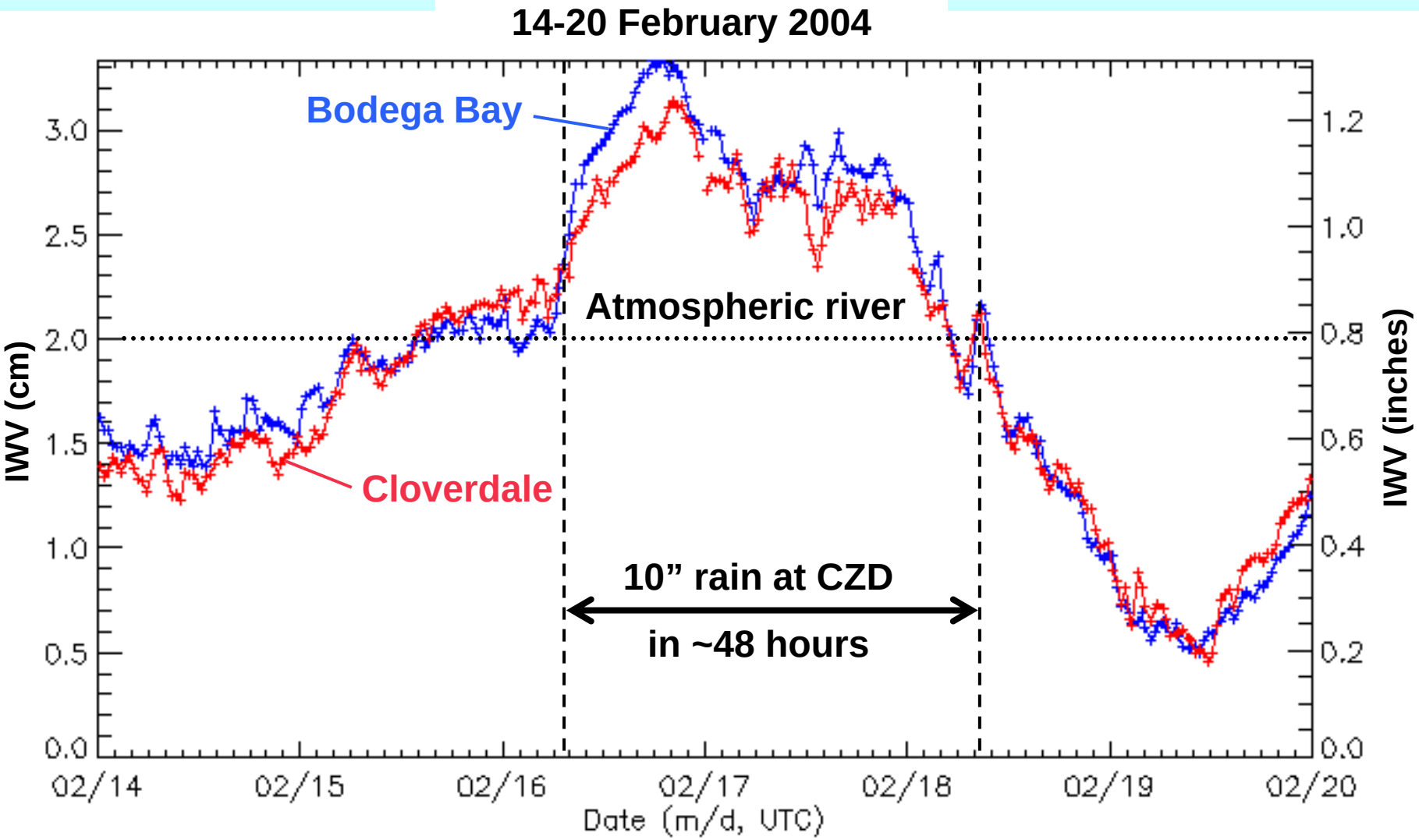
# Precipitation Process Partitioning (*White et al. 2003, J. Hydromet*)



# Atmospheric Rivers (*Ralph et al. 2004, MWR*)

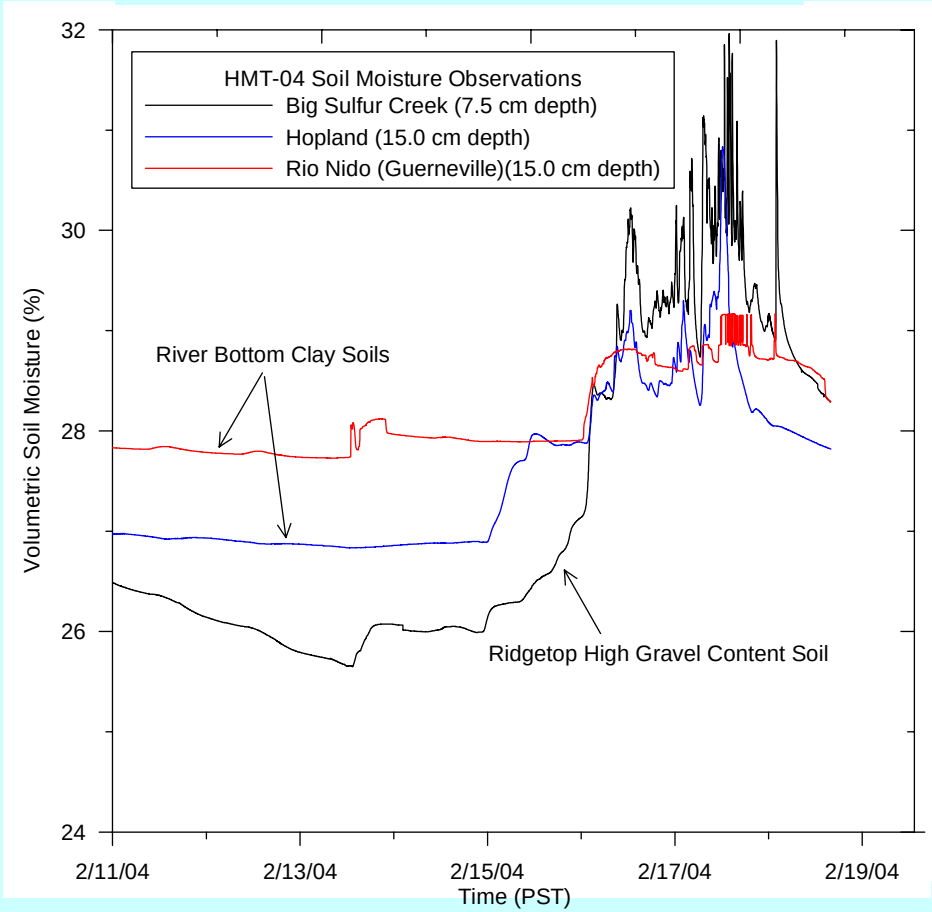


# GPS IWV data from near CZD



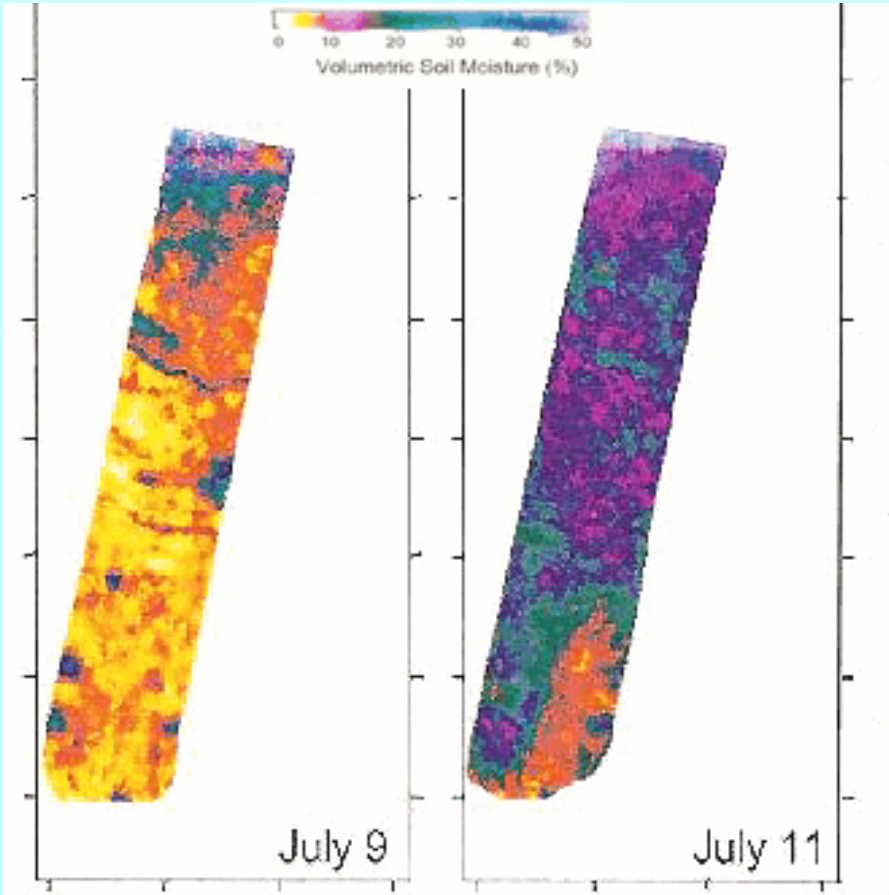
# Soil Moisture Mapping

## Ground based In Situ



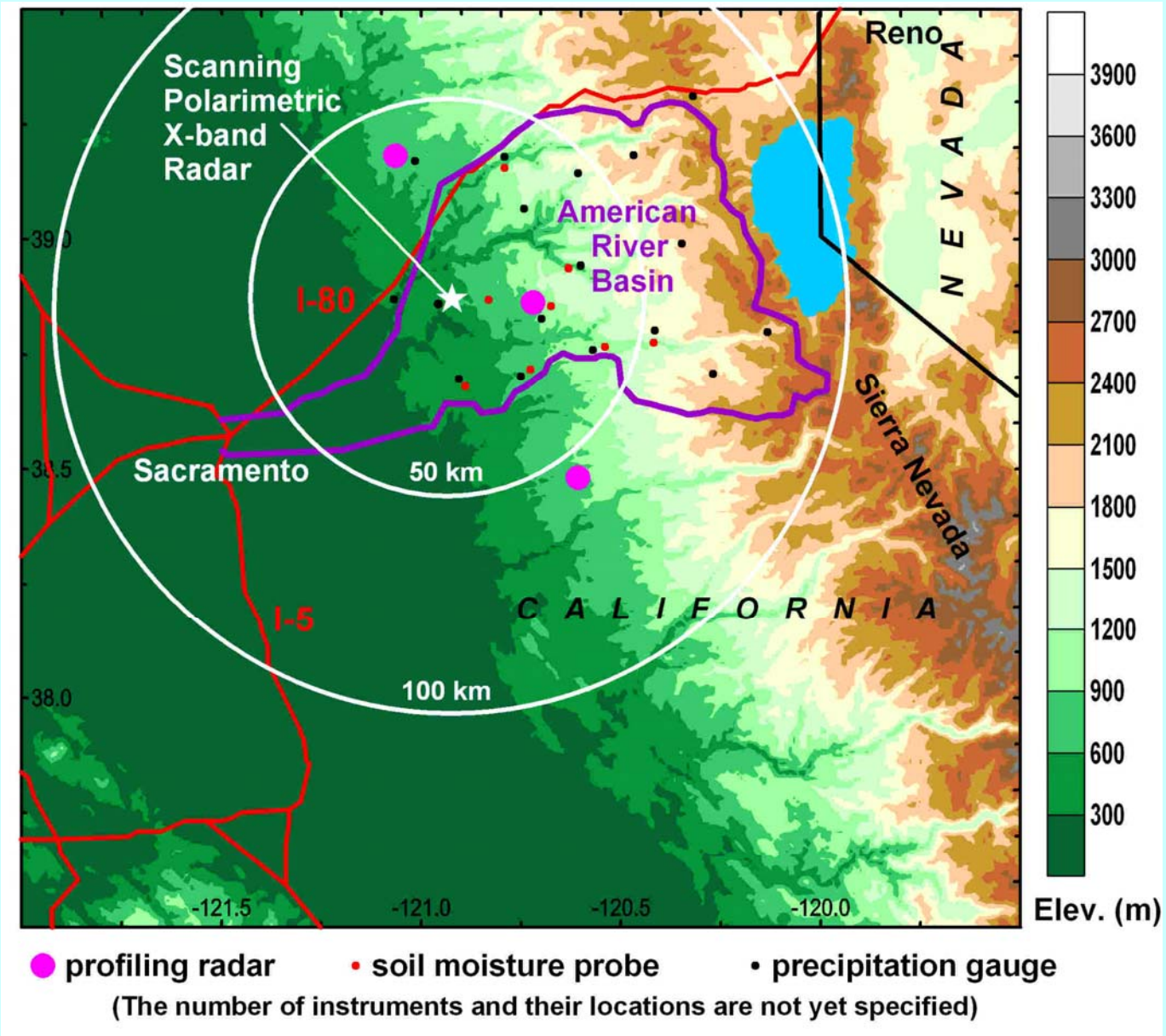

**Contrasting soil moisture time series from ground based in situ sensors for Russian River flood case**

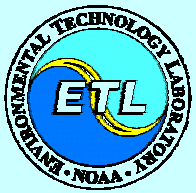
## Airborne Polarimetric Scanning Radiometer

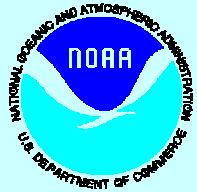



**Patterns of volumetric soil moisture content measured by airborne polarimetric scanning radiometer over central Oklahoma.**

# HMT-WEST: American River Basin 2005-2008

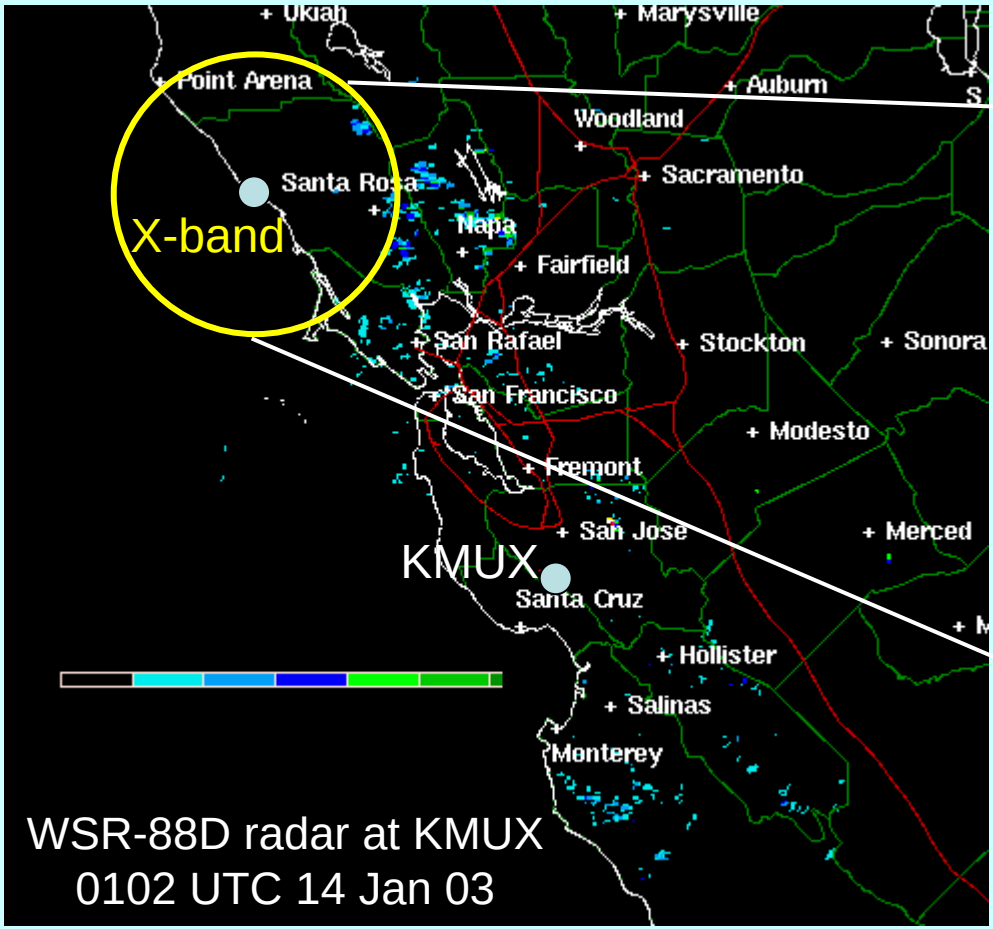


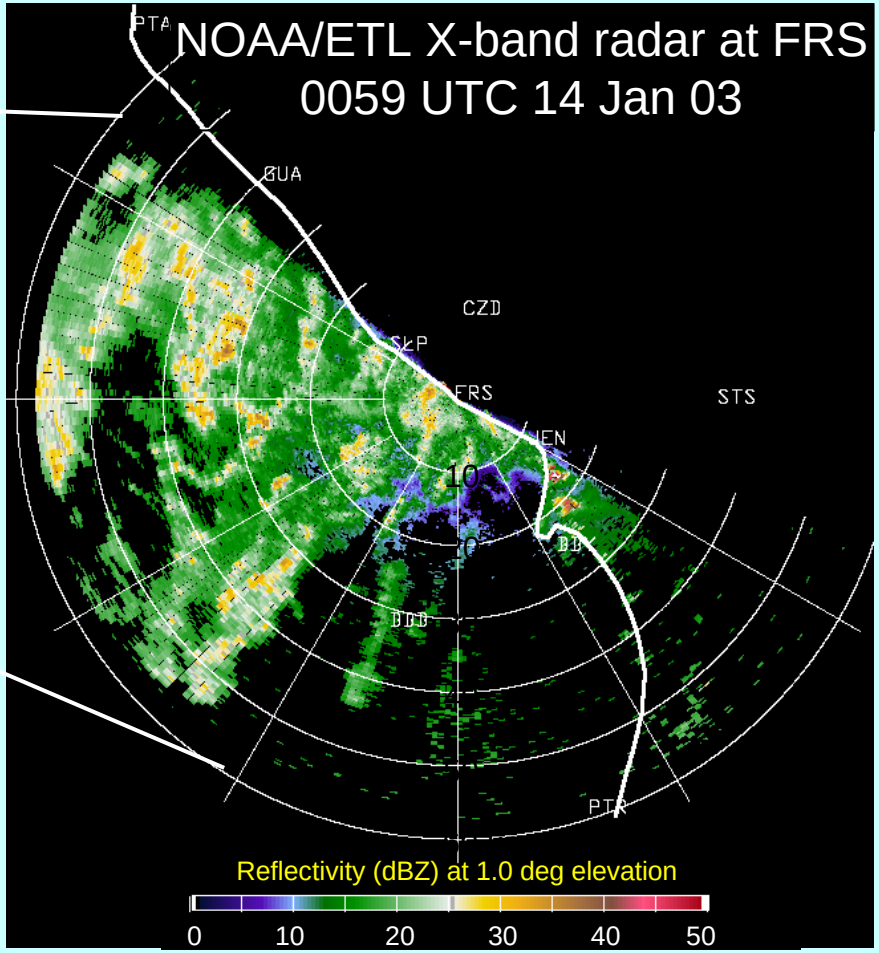

ENVIRONMENTAL TECHNOLOGY LABORATORY
ETL
NOAA


NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE

CIRES

# Coastal Gap-Filling X-band Radar vs. WSR-88D



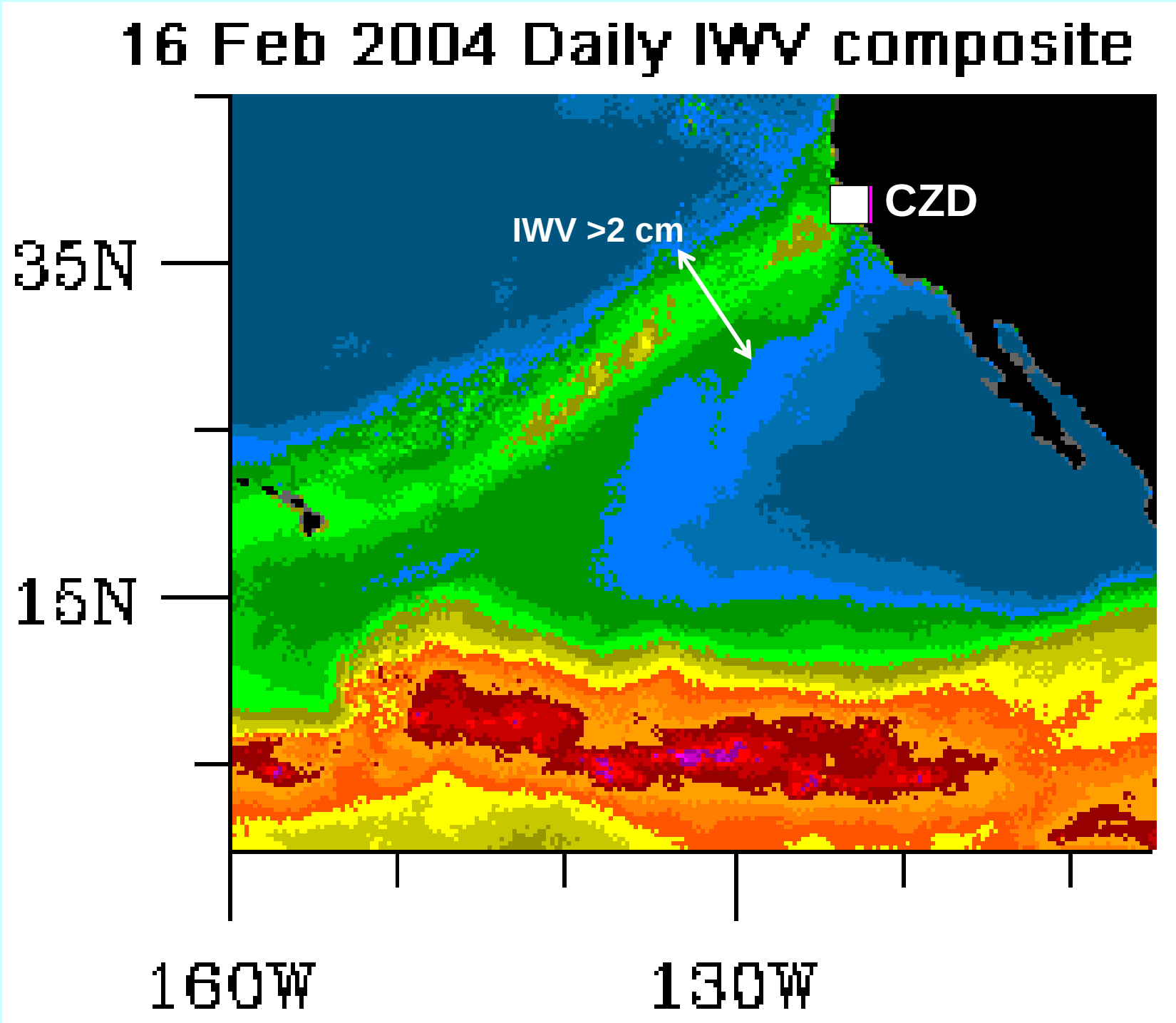




- **Nearest NEXRAD radar sees no significant echoes approaching flood-prone watershed**
- **NOAA/ETL's Coastal X-band radar fills NEXRAD gap**

# ETL Observing System Contributions

| Observing System | Project | Commitment 2005 > 90 % | 2006 > 90 % | Possible Additions |
|---|---|---|---|---|
| 915 MHz Profiler | HMT, Wx-Clim, CCOS, Prof-Eval | 7 | 7 | 0 |
| S-band Profiler / JW Disdrometer | HMT, Wx-Clim | 2 | 2 | 1 |
| GPS IWV | Wx-Clim | 2 | 3 | 1 |
| Scanning X-band Polarimetric Radar | HMT | 0 | 1 | 0 |
| Precip. Gauge / Soil Moisture | HMT | 6 | 6 | 10 |
| GPS Balloon Sounding | HMT | 0 | 1 | 0 |
| 449 MHz Profiler | Wx-Clim | 0 | 0 | 1 |
| Scanning C-band Doppler Radar | HMT | 0 | 0 | 1 |

HMT: Hydro-Meteorological Testbed
Wx-Clim: Weather-Climate Connection
CCOS: Central California Ozone Study
Prof-Eval: Profiler Evaluation Study

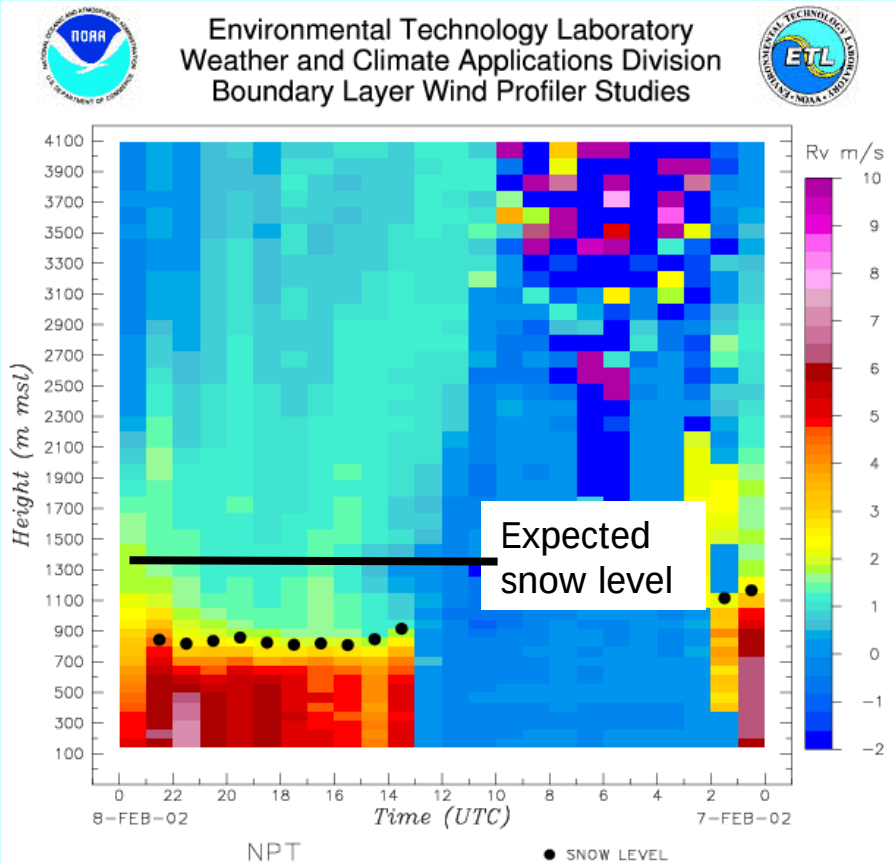

16 Feb 2004 Daily IWV composite
CZD
IWV >2 cm
35N
15N
160W
130W

# Winter Storm Warning Issued Based on PACJET-2002 Melting-Level Data

- Newport, OR profiler detected a lower snow level than had been expected (2700 ft vs 4000 ft).

- This caused Portland NWS to change from a Snow Advisory to a Winter Storm Warning.

White et al. (2002),
*J. Atmos. Ocean. Tech.*

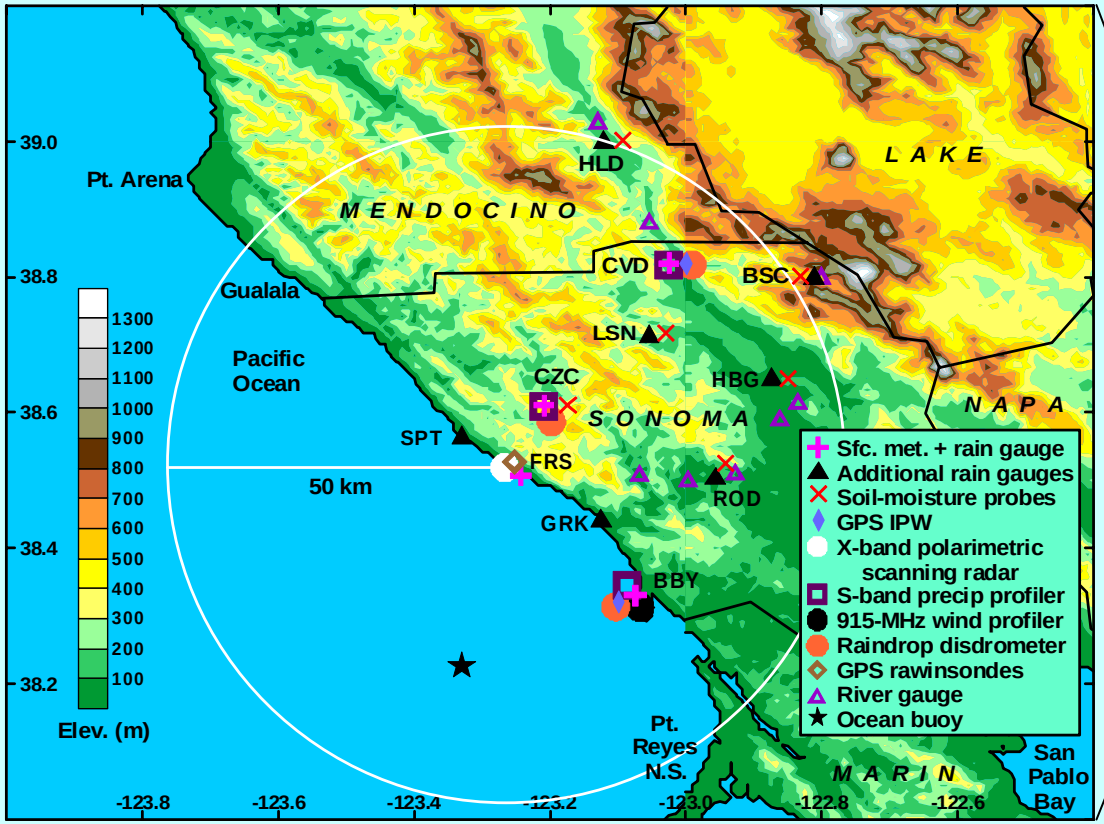
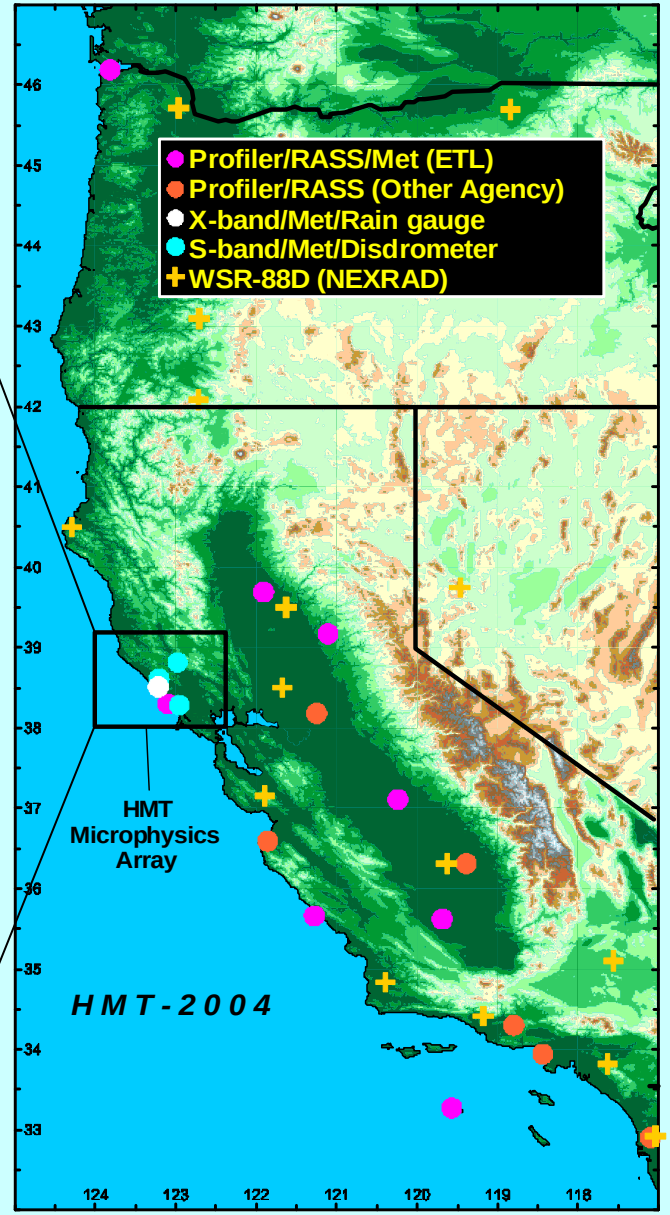
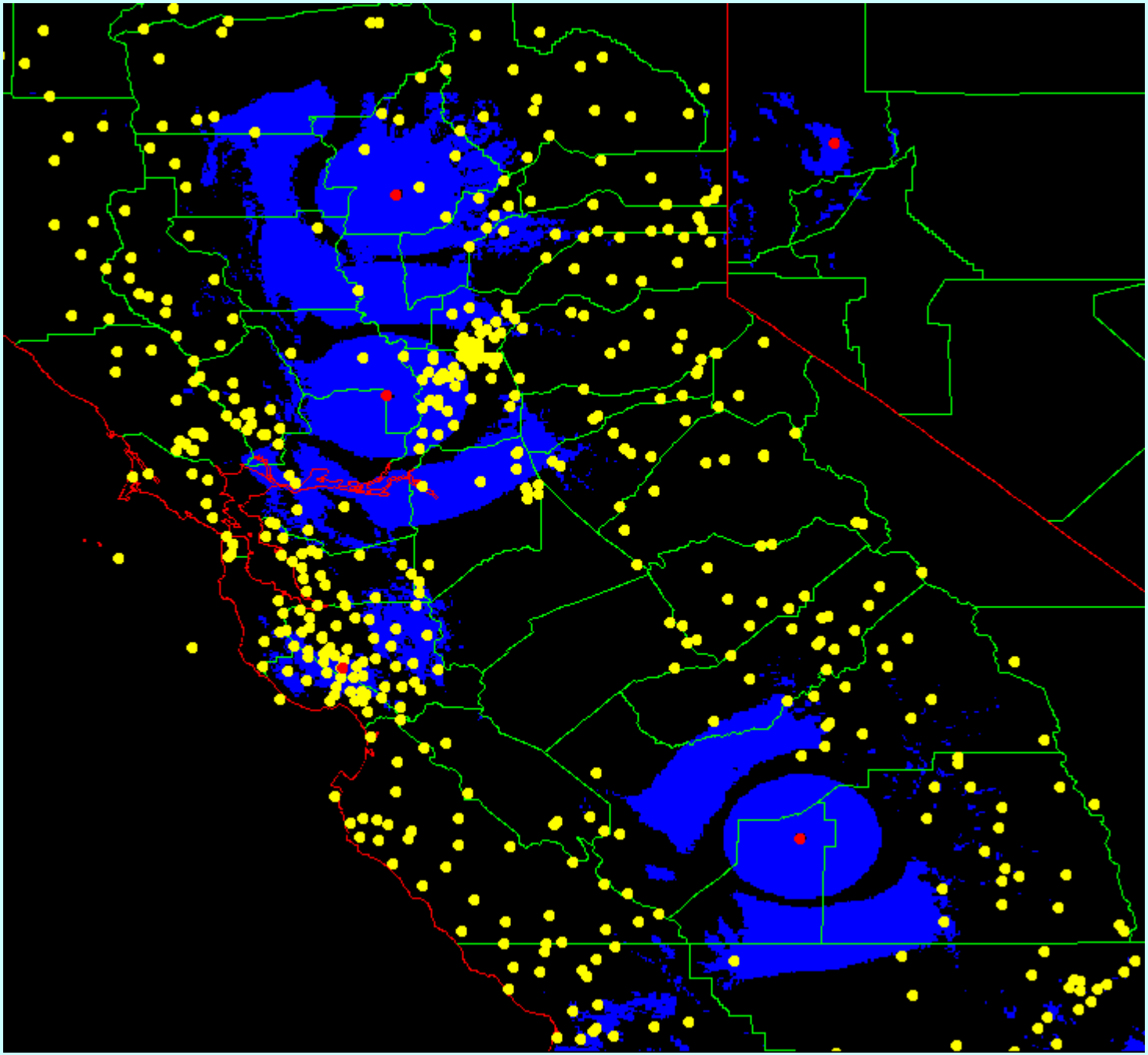



| Time (UTC) | 2330 | 2230 | 2130 | 2030 | 1930 | 1830 | 1730 | 1630 | 1530 | 1430 | 1330 | 1230 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Snow Level (m) | none | 843 | 818 | 836 | 858 | 825 | 811 | 820 | 809 | 847 | 915 | none |
| Snow Level (ft) | none | 2765 | 2683 | 2742 | 2814 | 2705 | 2660 | 2689 | 2653 | 2778 | 3001 | none |
| Sfc Temp (C) | 4.00 | 4.74 | 5.42 | 6.02 | 6.21 | 6.46 | 6.52 | 6.95 | 7.25 | 7.30 | 7.93 | 8.70 |

# HMT-2004

## A Hydrometeorological Testbed (HMT) for the Russian River Watershed

### HMT-2004 Microphysics Array



BBY = Bodega Bay
BSC = Big Sulfur Creek
CVD = Cloverdale
CZC = Cazadero
FRS = Fort Ross
GRK = Goat Rock
HBG = Healdsburg
HLD = Hopland
LSN = Lake Sonoma
ROD = Rio Dell
SPT = Salt Point