

# HMT-West Observing Systems

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# HMT Observing System Participants

- Everyone in the Water Cycle Branch (PSD2)
- Seth Gutman and Kirk Holub (GSD – GPS-Met)
- Ken Howard and Dave Jorgensen (NSSL – SMART-R)
- Jessica Lundquist (Univ. of Washington – level loggers)
- Mike Dettinger (SCRIPPS – network design)
- Frank Gehrke (CA DWR – snow pillows; sfc met)
- Ed Clark (Col. Basin Riv. Forecast Center – AZ SM project)

Gary Carter (NWS-OHD; Hydrology Program Manager)

Marty Ralph (PSD2 Branch Chief; ST&I Program Manager)

Tim Schneider (HMT Project Manager)

Dave Kingsmill (HMT Chief Scientist)

Jim Jordan (Observing Systems Team Lead)

Clark King (PSD2 Deputy and Field Operations Manager)

Tim Coleman (New PSD2 Data Manager)

Tina Schiffbauer (travel, electricity and phone admin, budget admin, branch sanity!)

# HMT Observing Systems

## Precipitation Disdrometers

### Precipitation Gauges



### X-POL

### S-PROF



### Radars, Profilers and Sounding Systems



# HMT Observing Systems

## Precipitation Disdrometers

## Precipitation Gauges



## X-POL

## S-PROF



Soil Moisture,  
Snow WE, Depth  
Surface Energy,  
Streamlevel, IPW

## Radars, Profilers and Sounding Systems



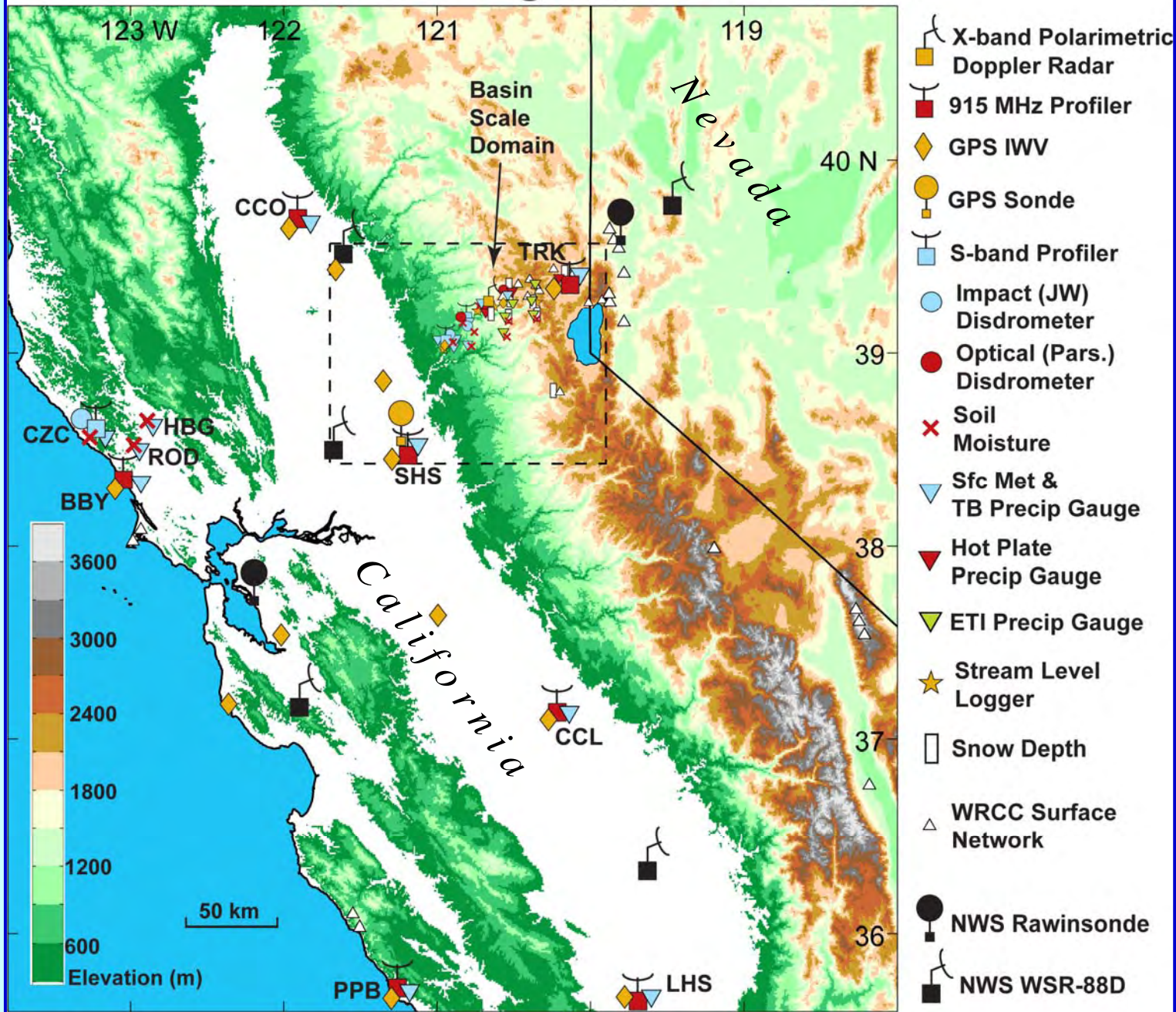
## Snow pillow



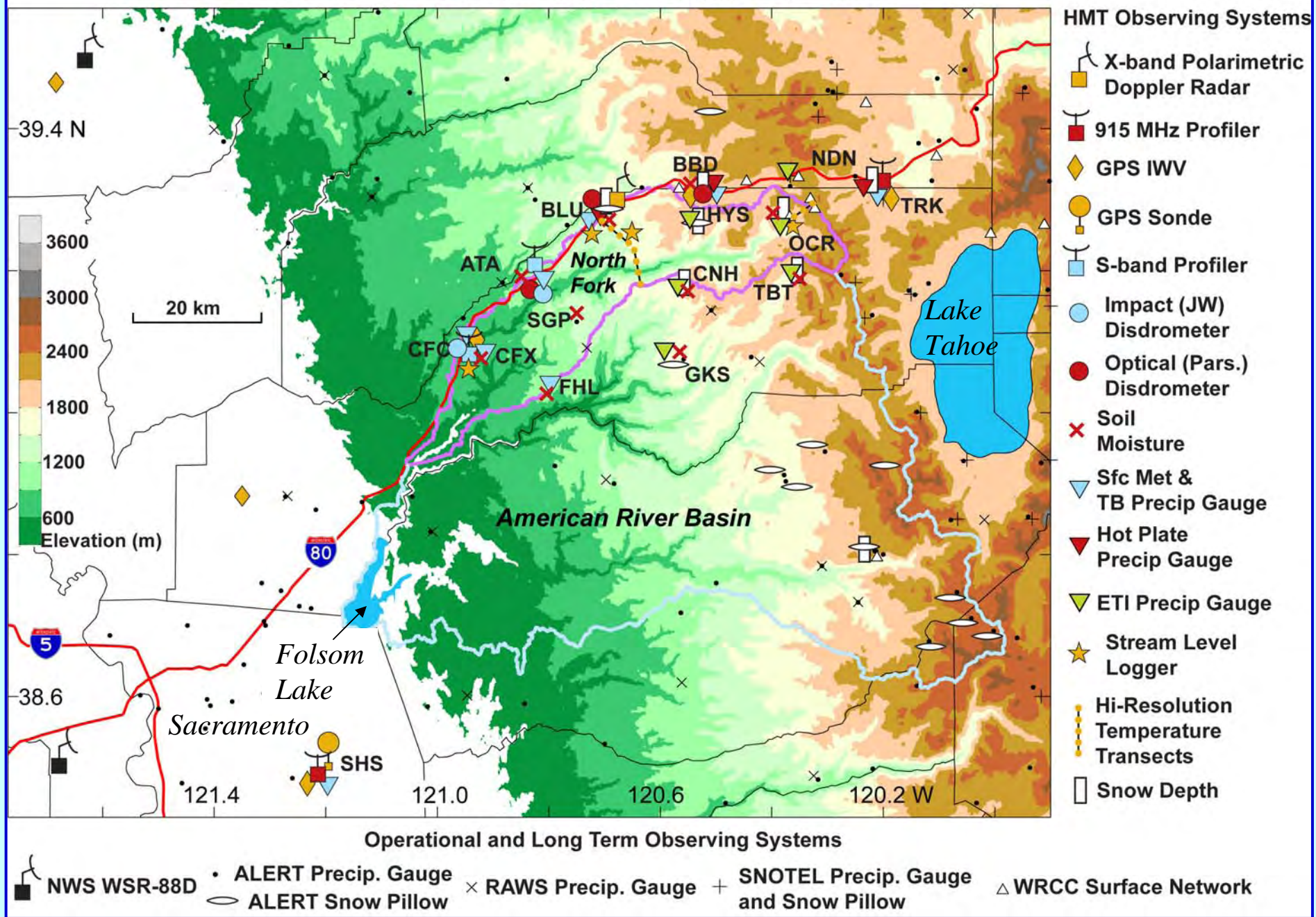
GPS



# HMT-WEST 2007-2008: Regional Scale Domain



# HMT-WEST 2007-2008: Basin Scale Domain



# Big Bend Field Site (elev. = 5705 ft)

Lots of snow to contend with...



# HYDROX at Blue Canyon (elev. = 5282 ft.)



## Looking SSE



## Looking ENE







Winter Wonderland????  
~\$40 k spent on snow removal!

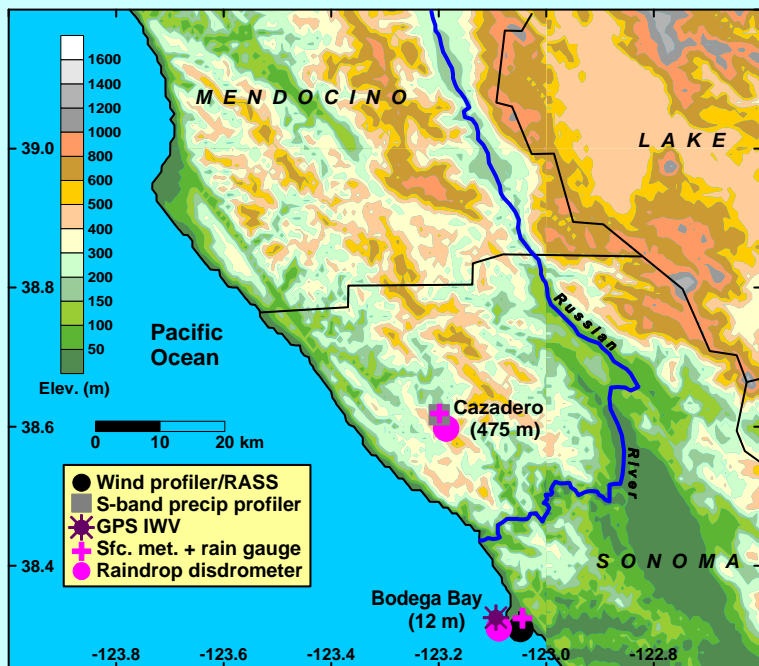
# Coastal Atmospheric River Observatory

## Atmospheric River Observatory (ARO): Russian River Prototype

Objectives: Monitor key atmospheric river and precipitation characteristics.

### Observing systems:

1. Wind profiler/RASS
2. S-band radar
3. Disdrometer
4. Surface met
5. GPS-IWV
6. Rain gauges

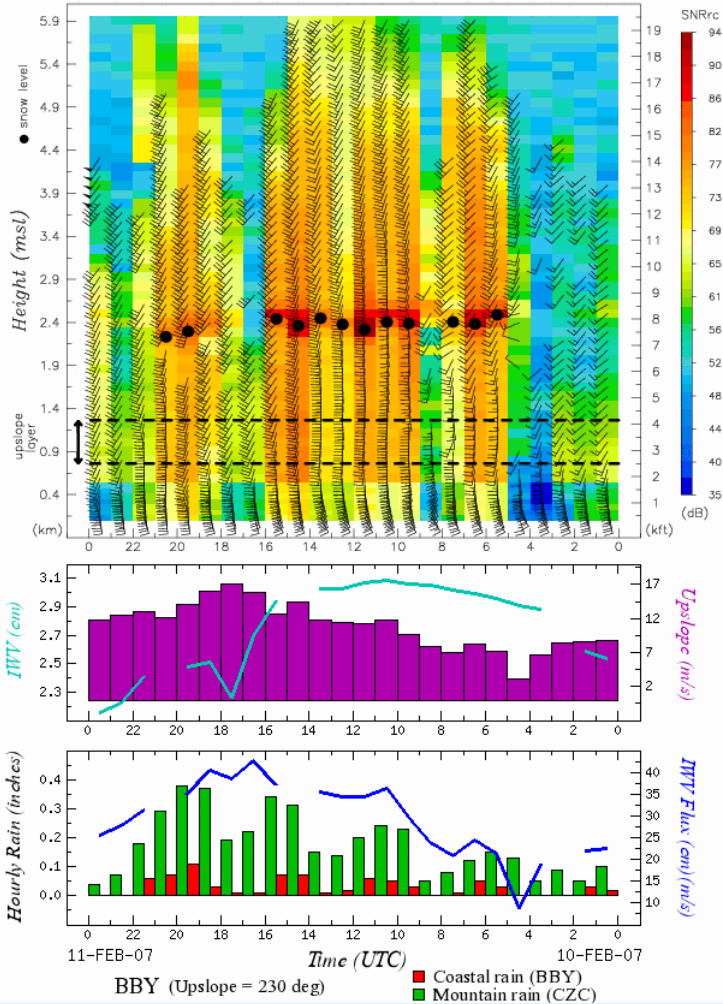


# Real-time products

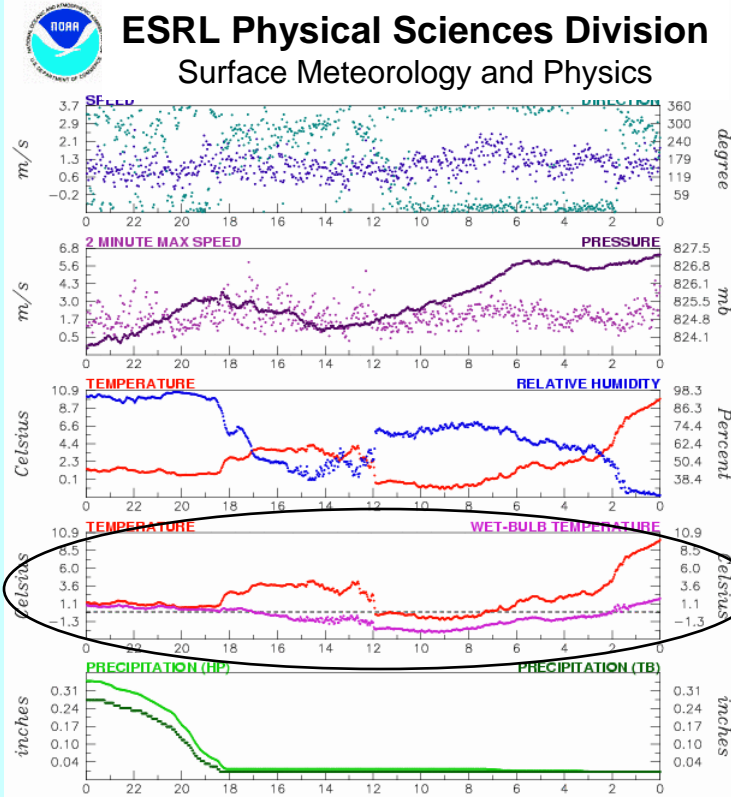
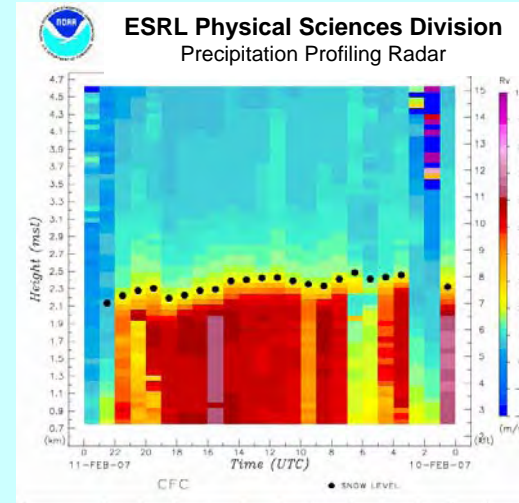
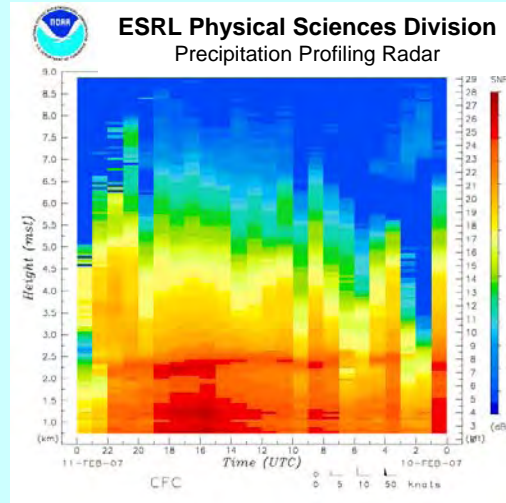
## Integrated Water Vapor Flux



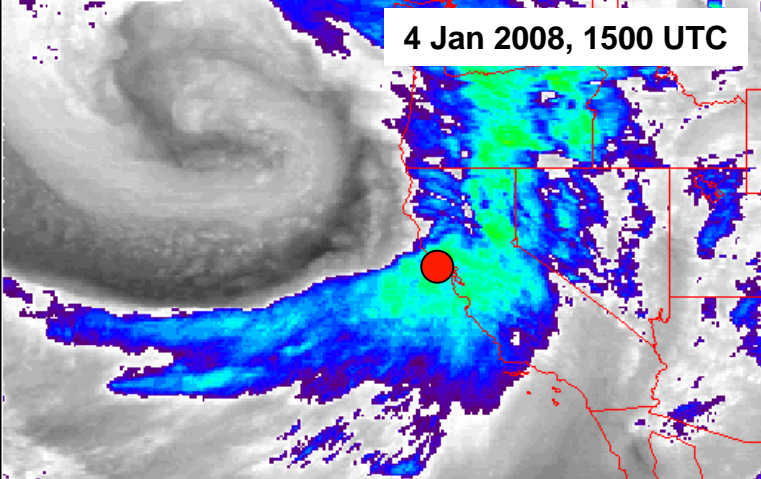
### ESRL Physical Sciences Division Wind Profiling Radar



# Snow Level

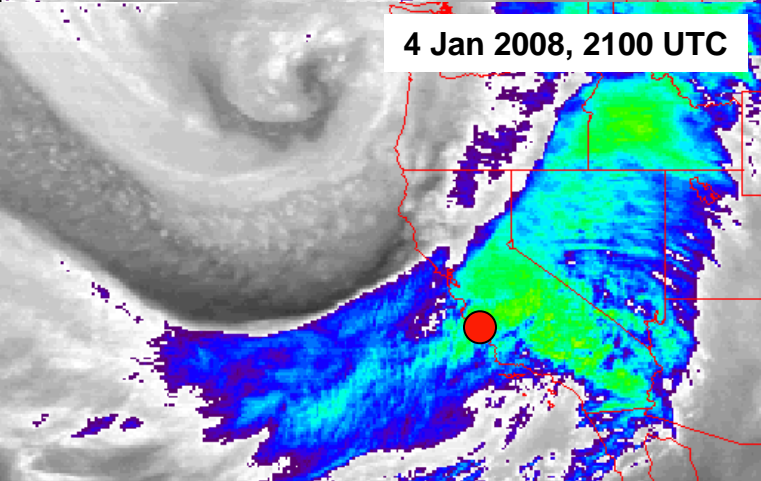
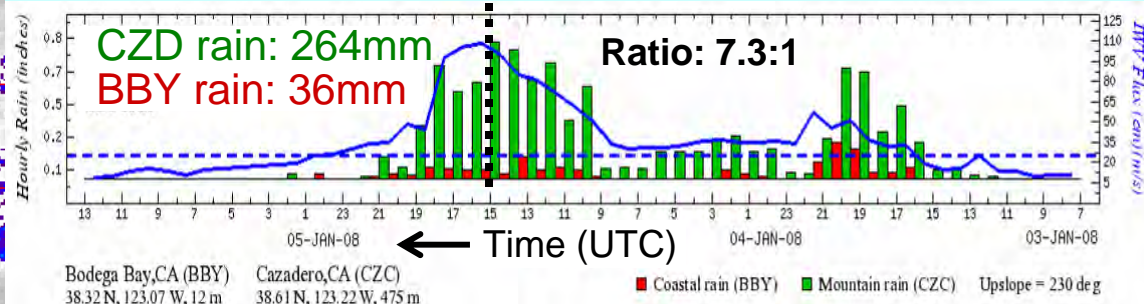


Wet-Bulb  
Temperature



4 Jan 2008, 1500 UTC

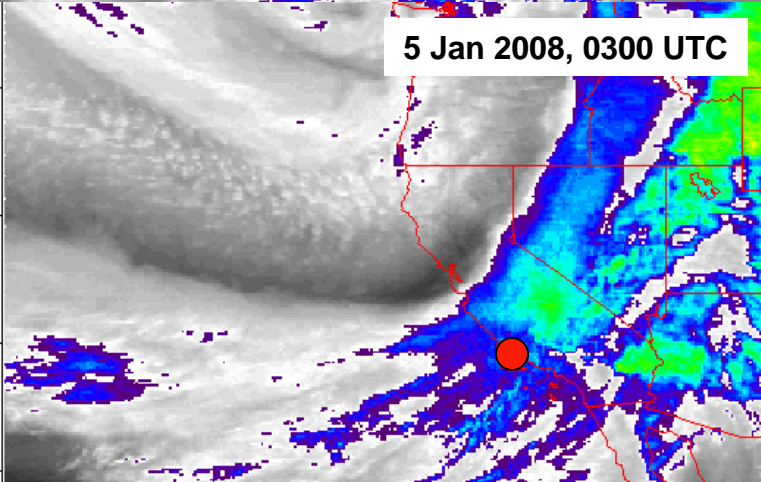
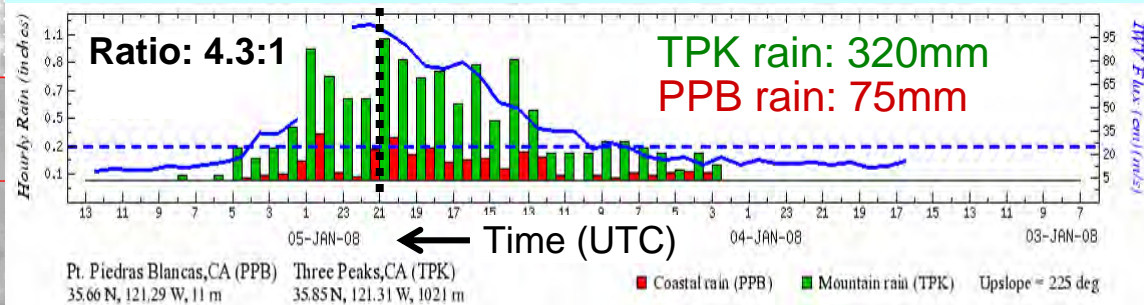
## Time of max. IWV flux at BBY: 1500 UTC 4-Jan-08



4 Jan 2008, 2100 UTC

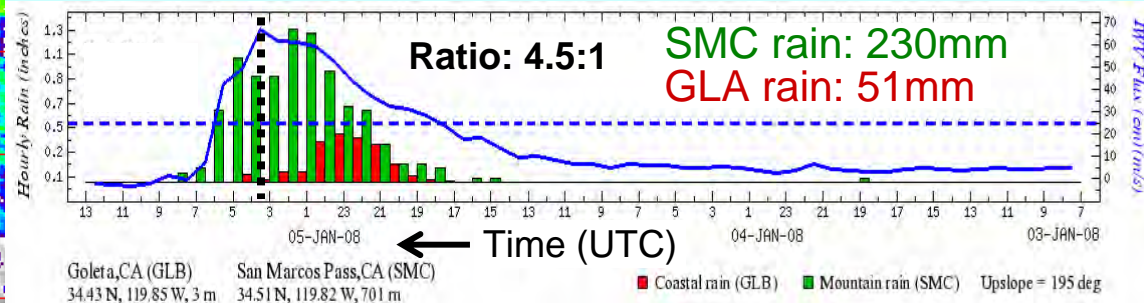
## Max. IWV flux in AR highly correlated with max. mountain rainfall at each site

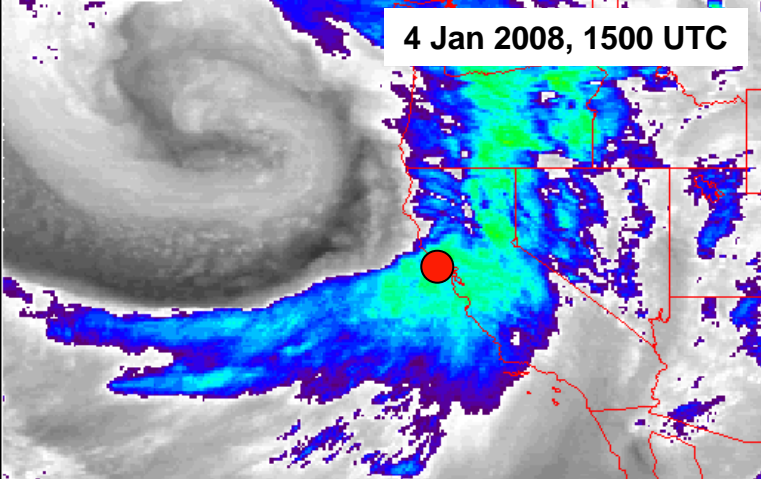
### Time of max. IWV flux at PPB: 2100 UTC 4-Jan-08



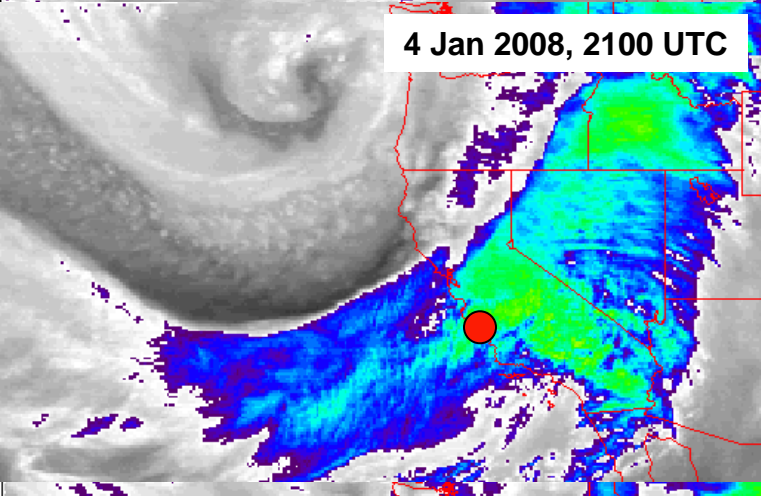
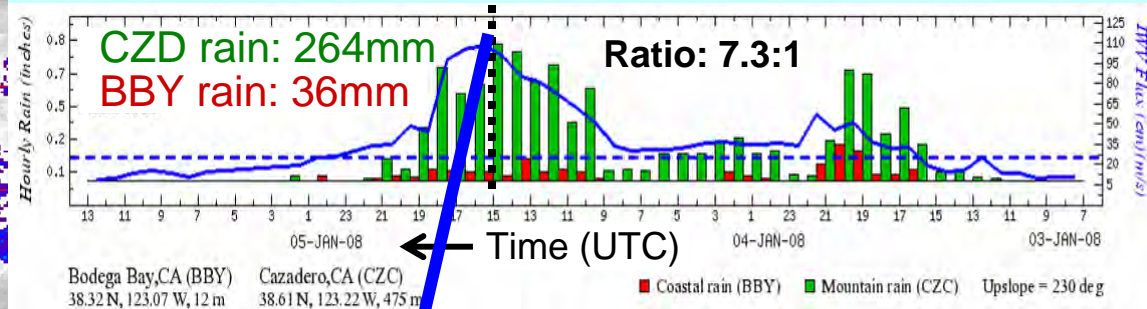
5 Jan 2008, 0300 UTC

## Time of max. IWV flux at GLA: 0300 UTC 5-Jan-08



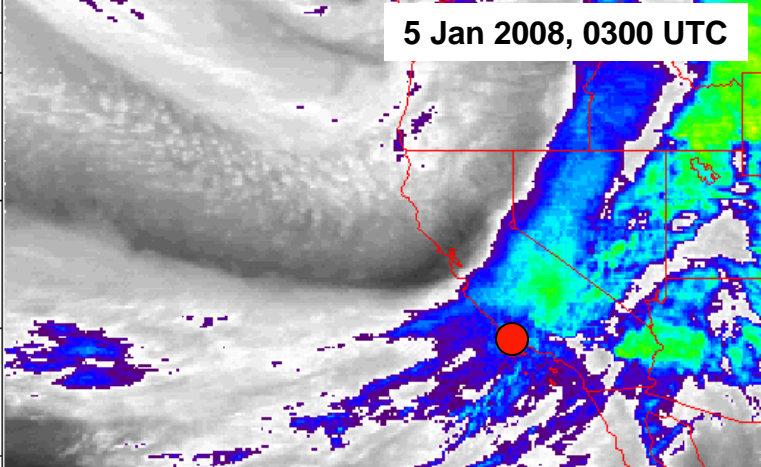
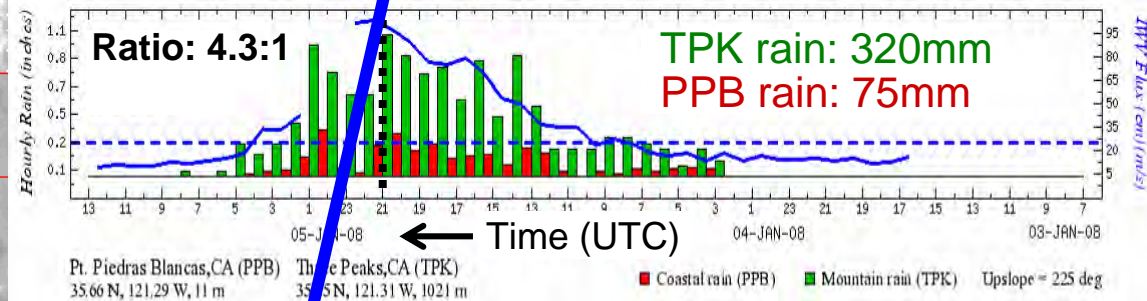


Time of max. IWV flux at BBY: 1500 UTC 4-Jan-08



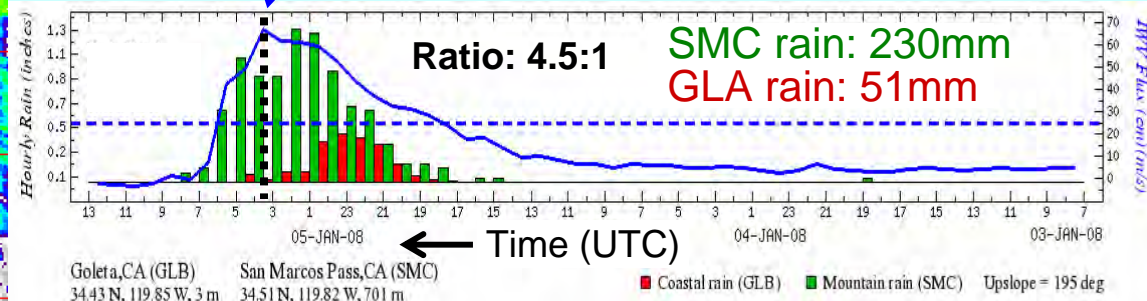
Max. IWV flux in AR highly correlated with max. mountain rainfall at each site

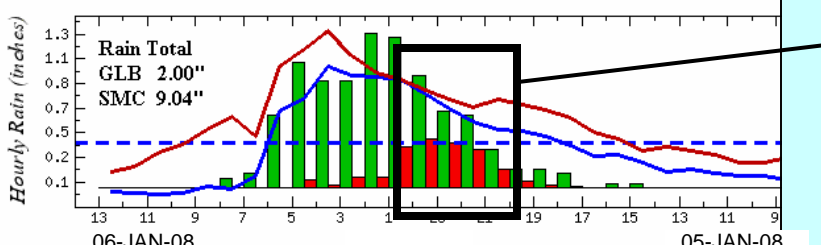
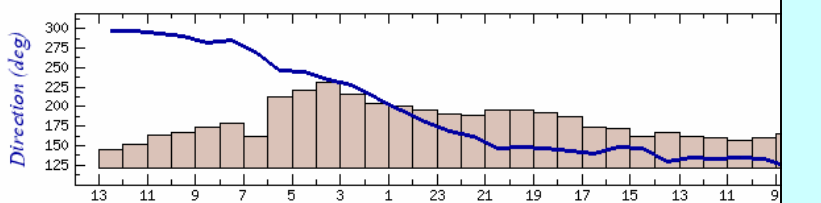
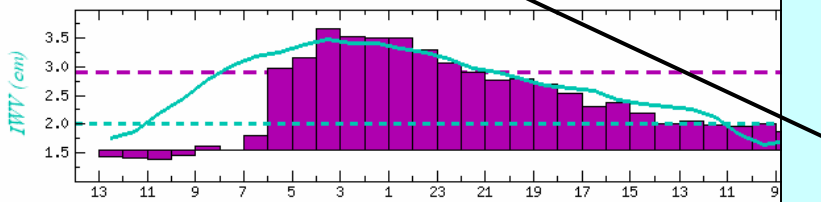
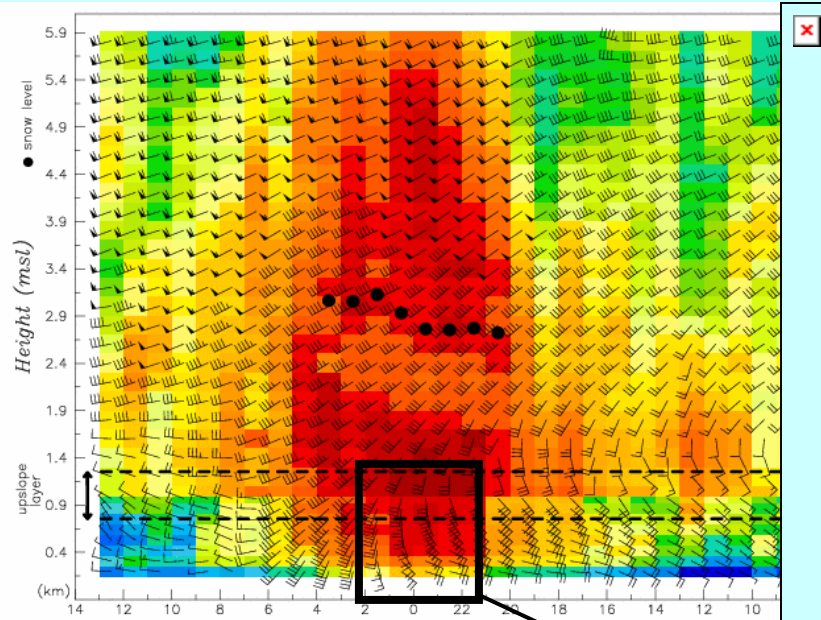
Time of max. IWV flux at PPB: 2100 UTC 4-Jan-08



AR Propagation:  $\sim 12 \text{ m s}^{-1}$   
 $\frac{1}{2}$ -day lead time for SoCal

Time of max. IWV flux at GLA: 0300 UTC 5-Jan-08

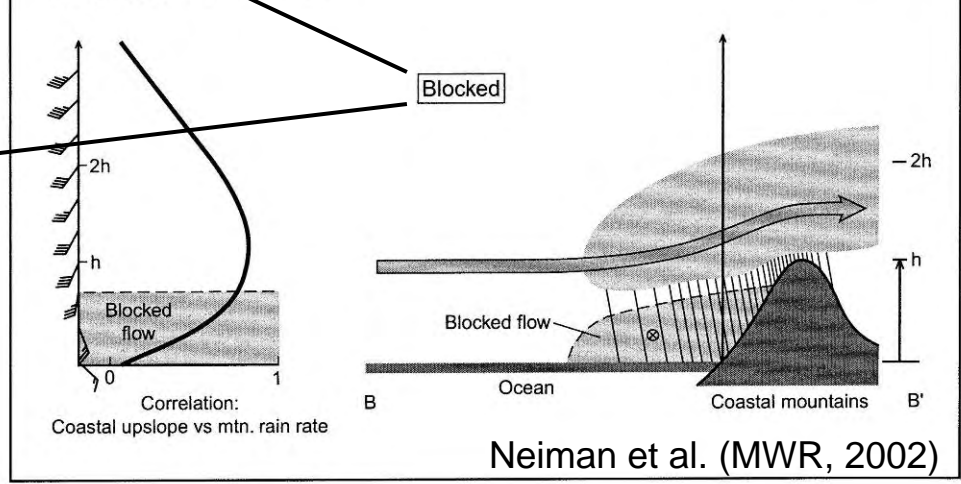
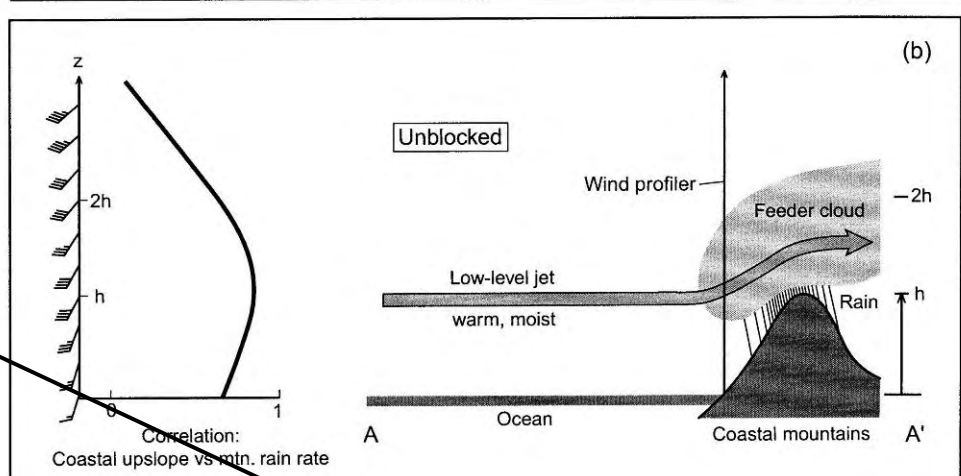
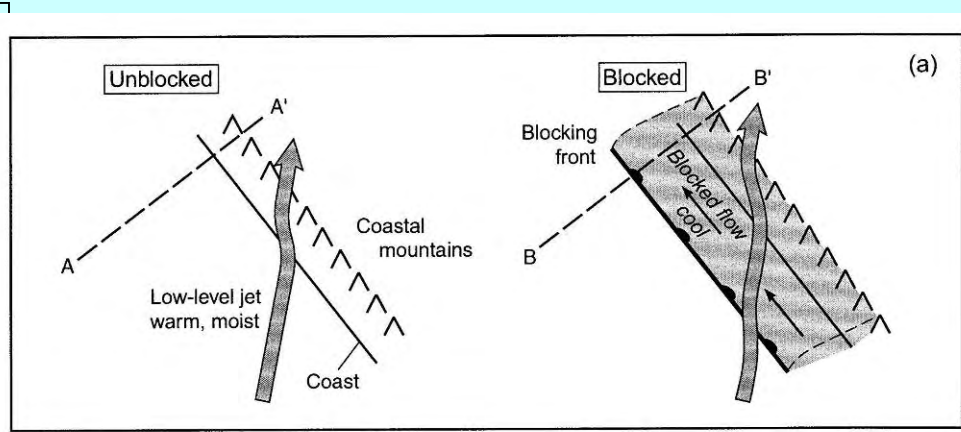




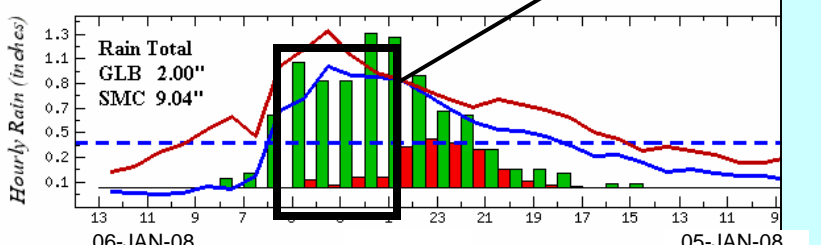
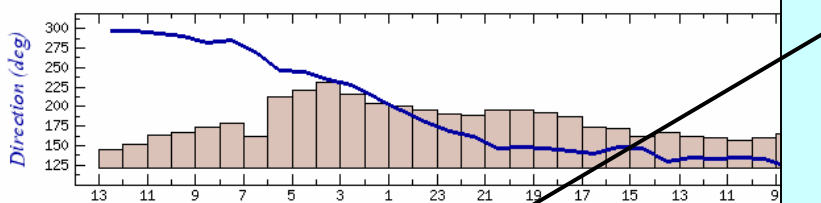
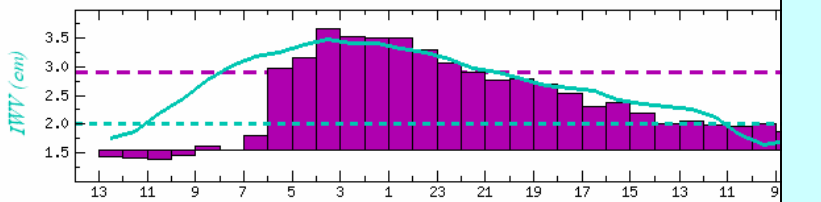
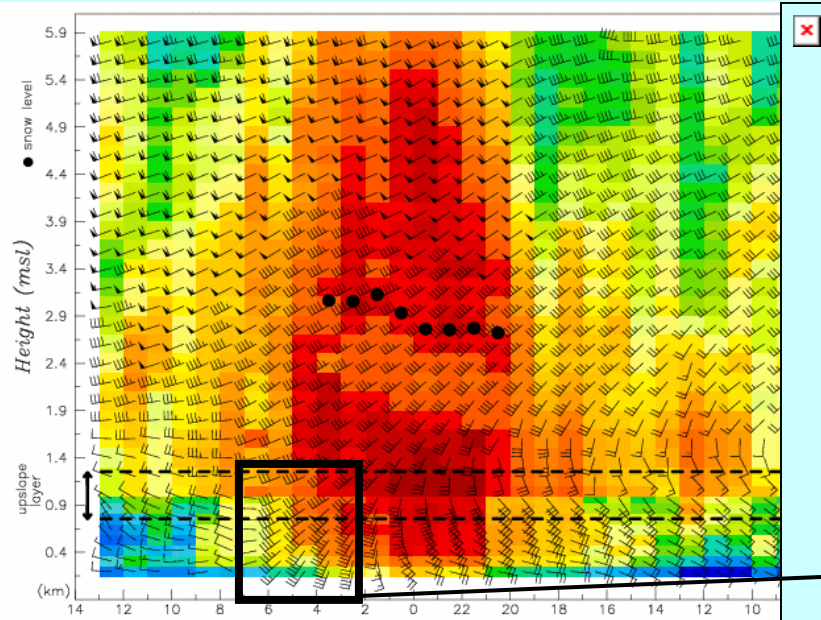
■ Coastal rain (GLB) ■ Mountain rain (SMC)

Goleta, CA (GLB)  
34.43 N, 119.85 W, 3 m

San Marcos Pass, CA (SMC)  
34.51 N, 119.82 W, 701 m



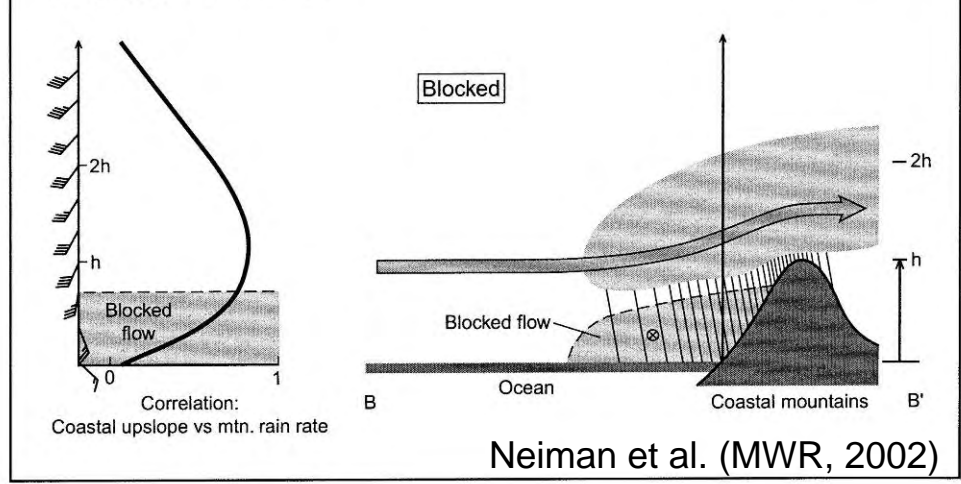
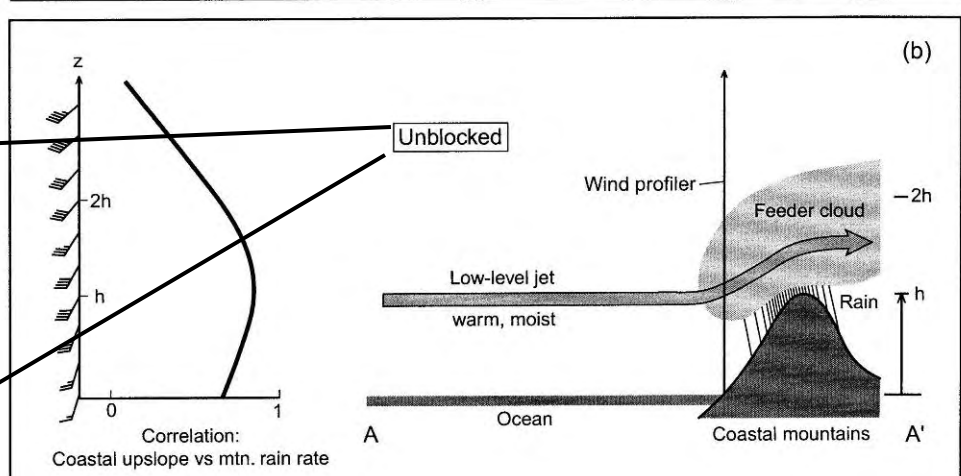
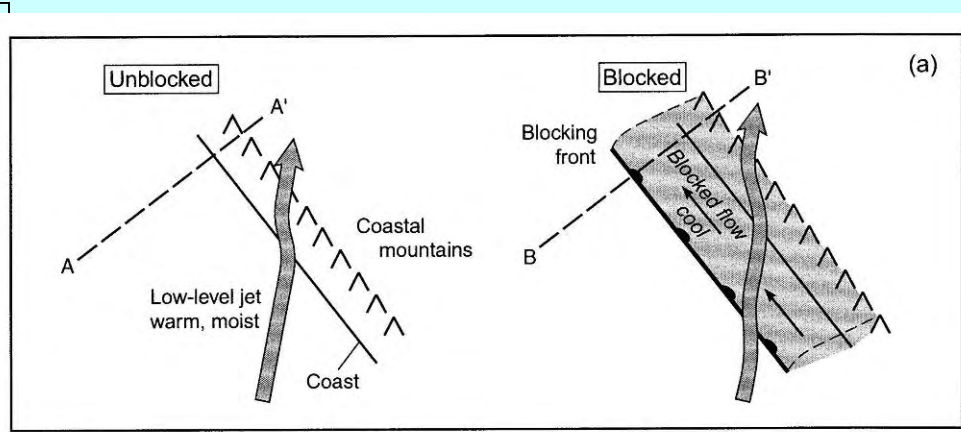
Neiman et al. (MWR, 2002)




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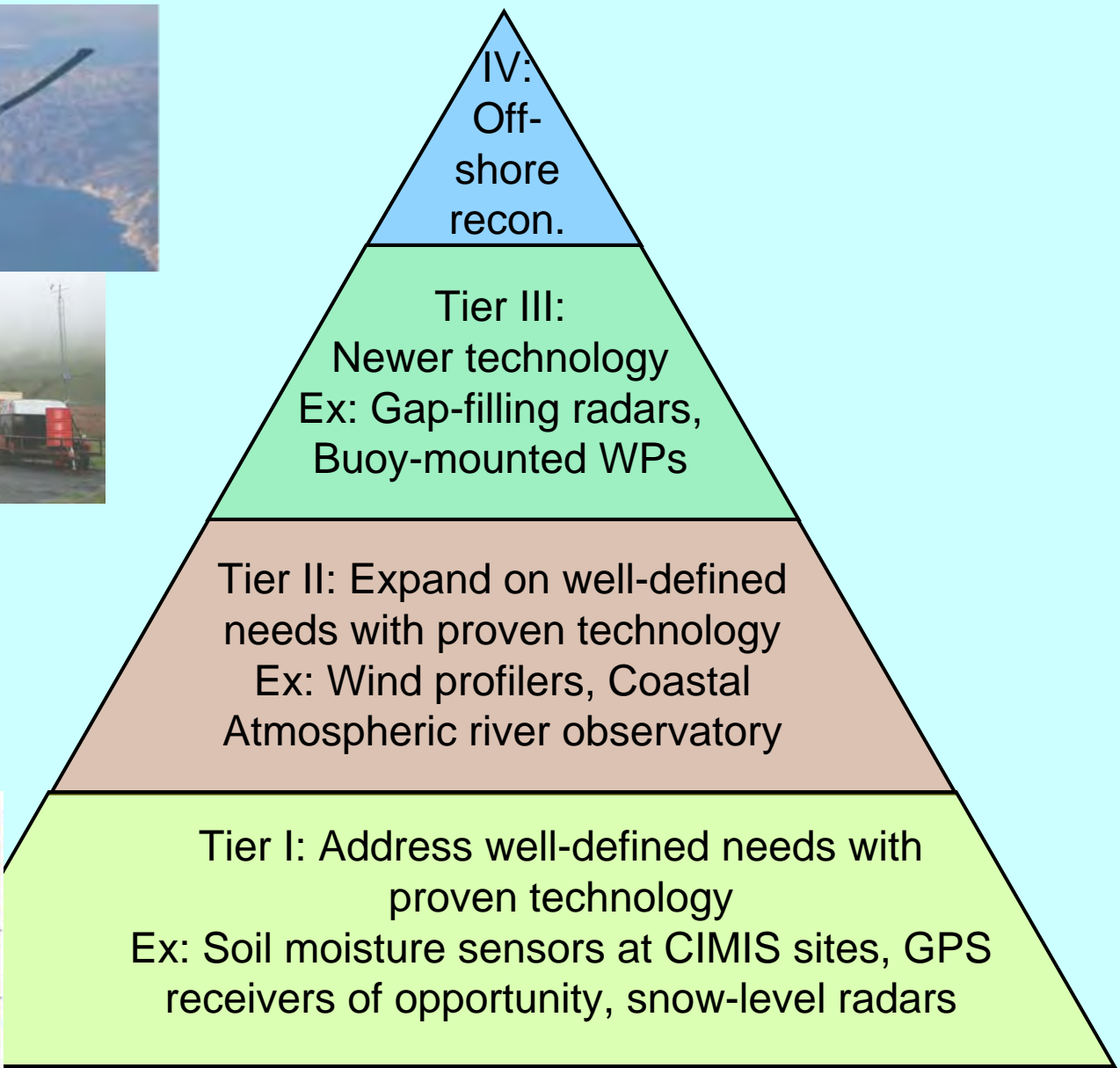
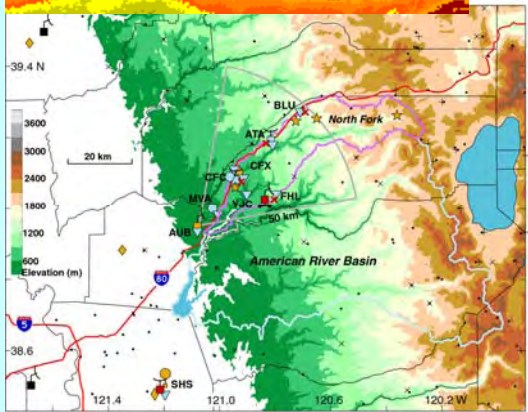
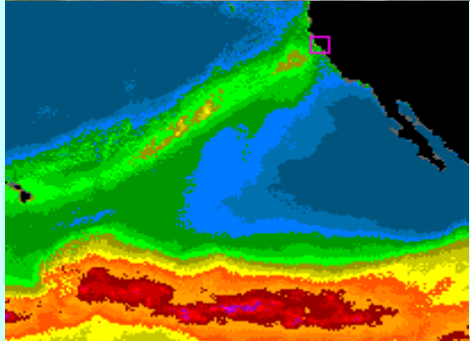
**CA Department of Water Resources  
(DWR) Enhanced Flood Response  
and Emergency Preparedness  
(EFREP) Program provides a legacy  
for NOAA's HMT-West**

**A Weather & Water Insurance Policy for California**

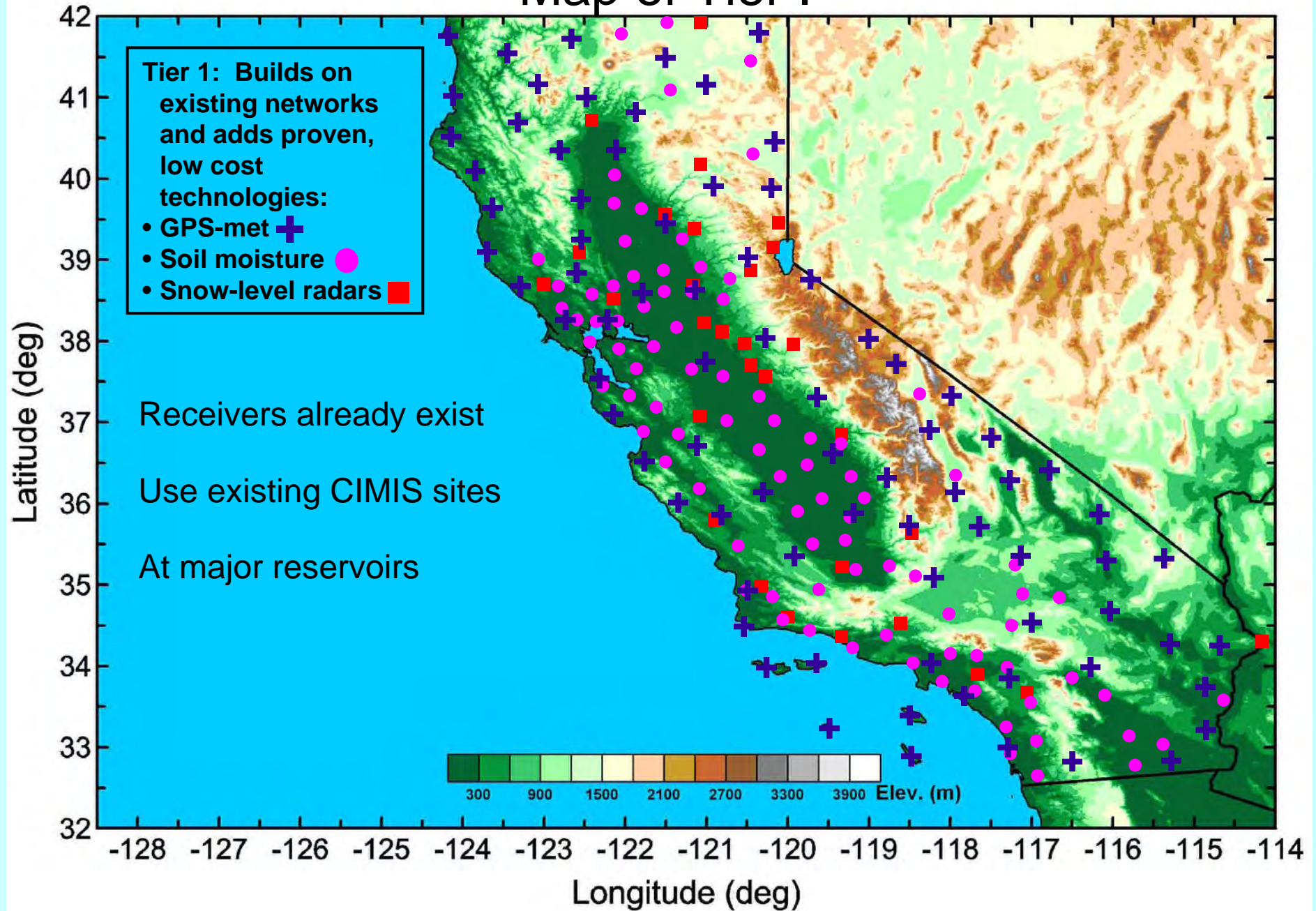
Photo by Stephan Dietrich



# A tiered approach for nex gen obs to help address CA's water resource issues

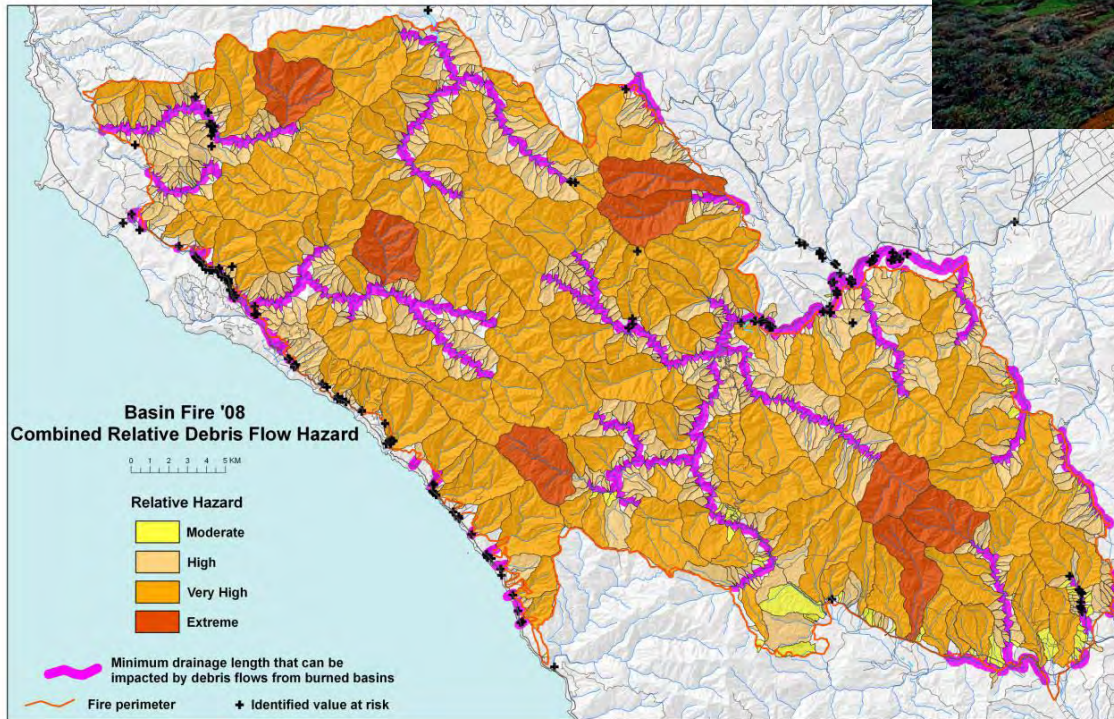


# Map of Tier I



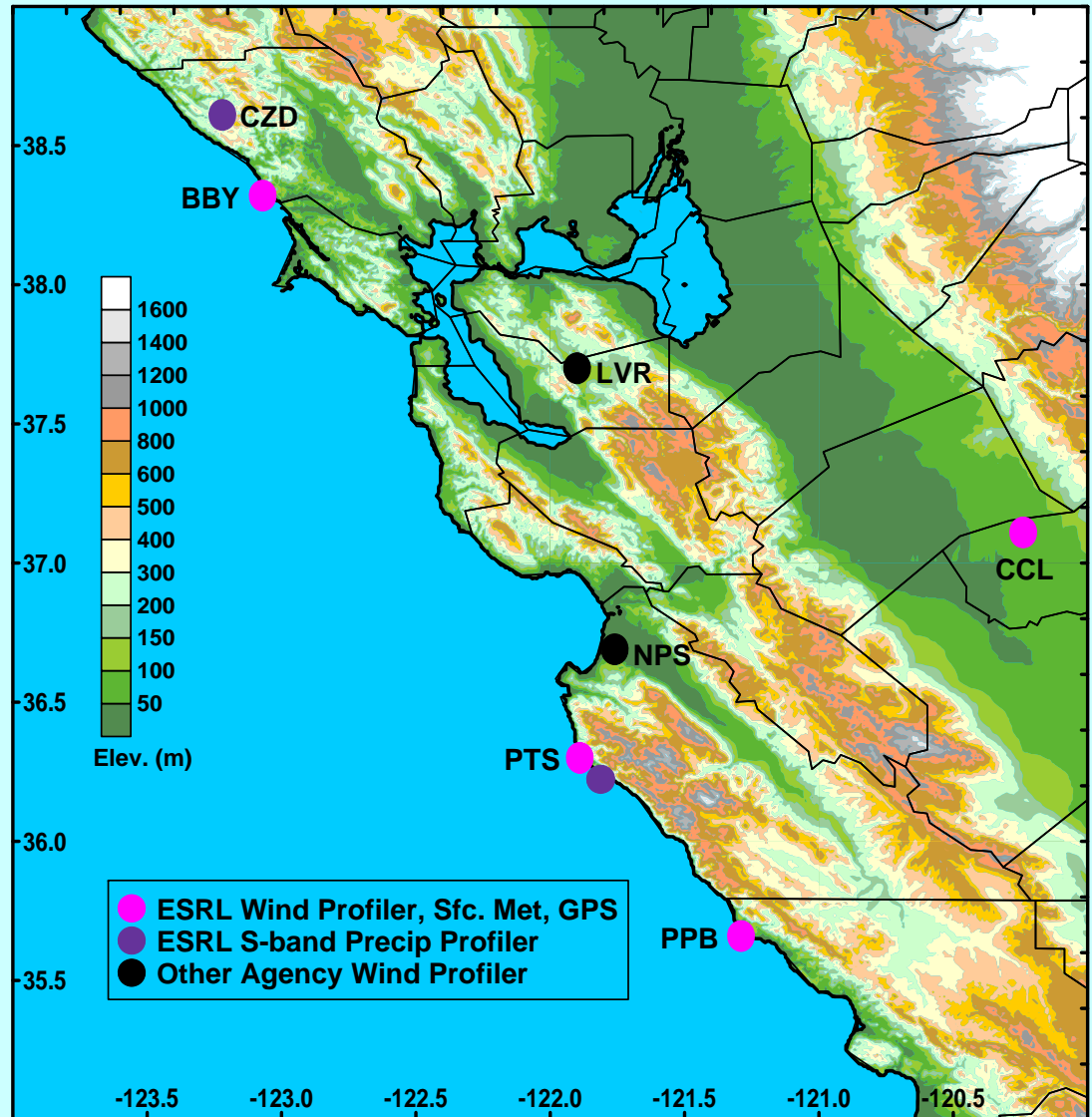
# Other ARO Applications: Debris Flows

USGS study indicates high risk for debris flows to occur in the Indian and Basin burn areas near Big Sur. SFO asked for our help.



Deadly and devastating La Conchita debris flow – Jan. 10, 2005

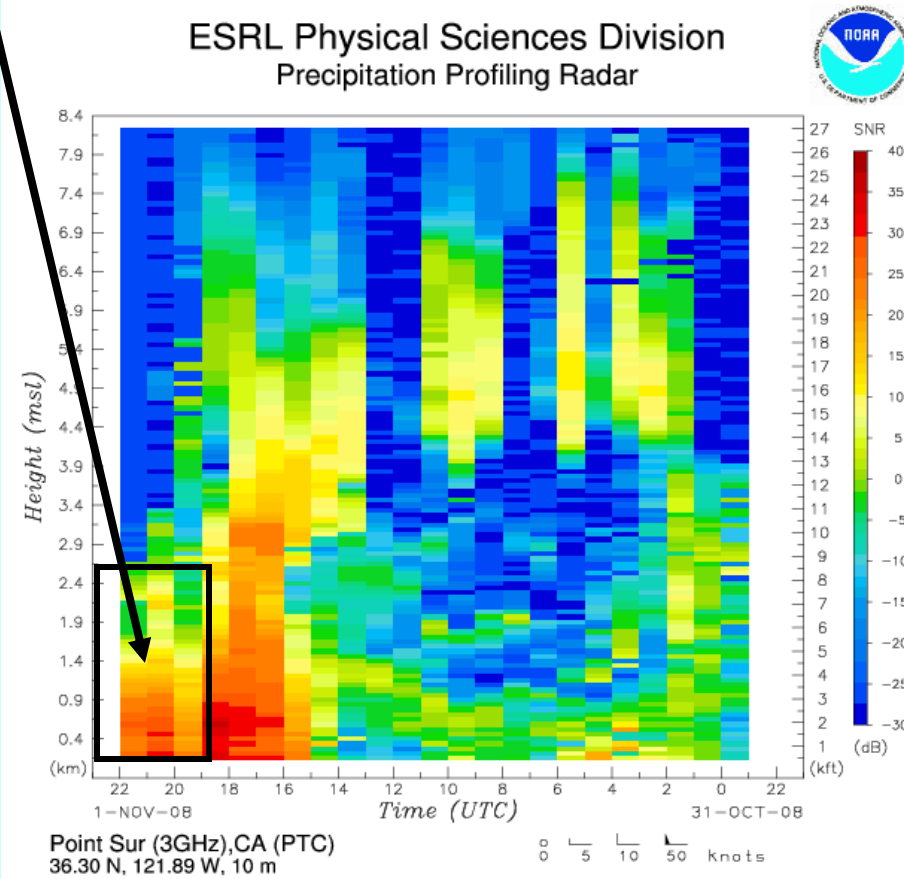
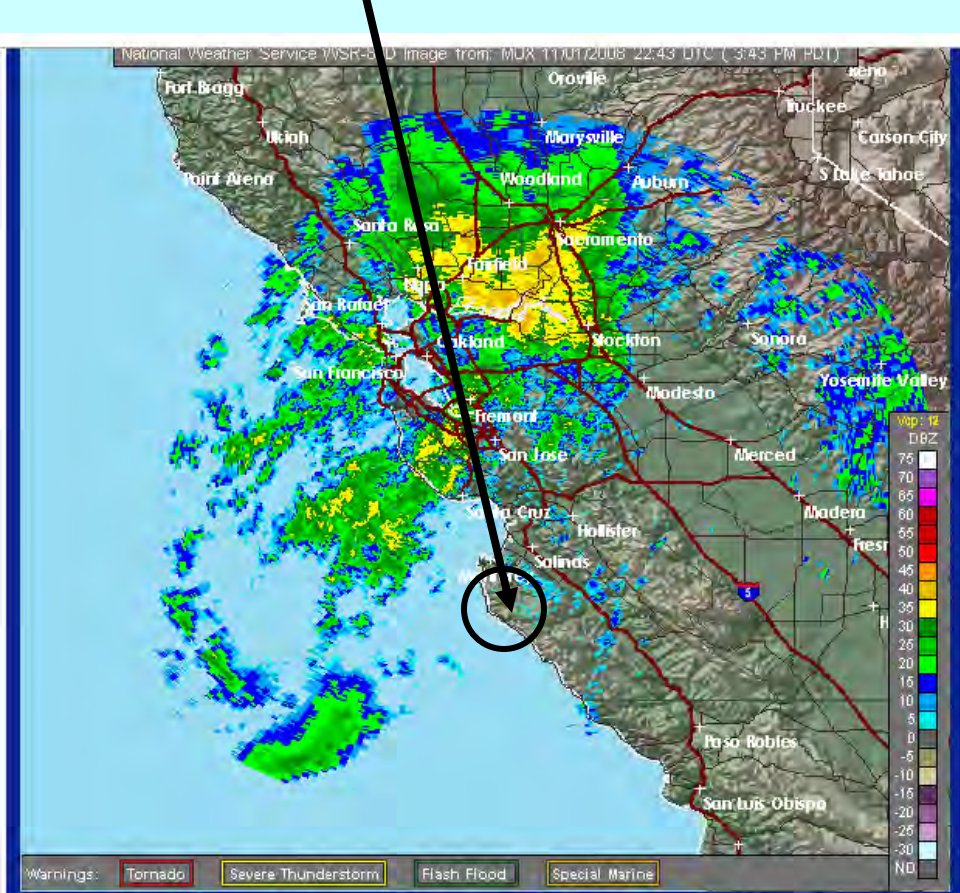
# Pt. Sur (PTS) Atmospheric River Observatory



NEXRAD shows  
no rain echo over burn area

# First comparison (last weekend) of Pt Sur S-PROF with NEXRAD in support of debris flow project

Pt Sur S-PROF radar  
shows shallow rain echo

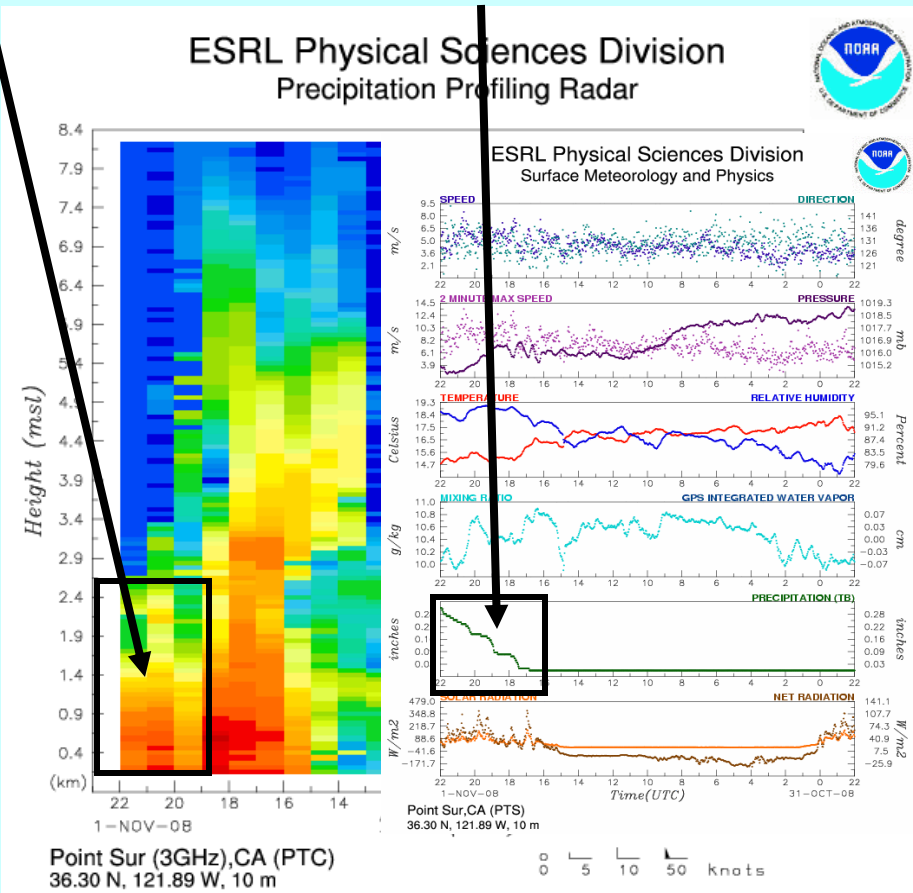
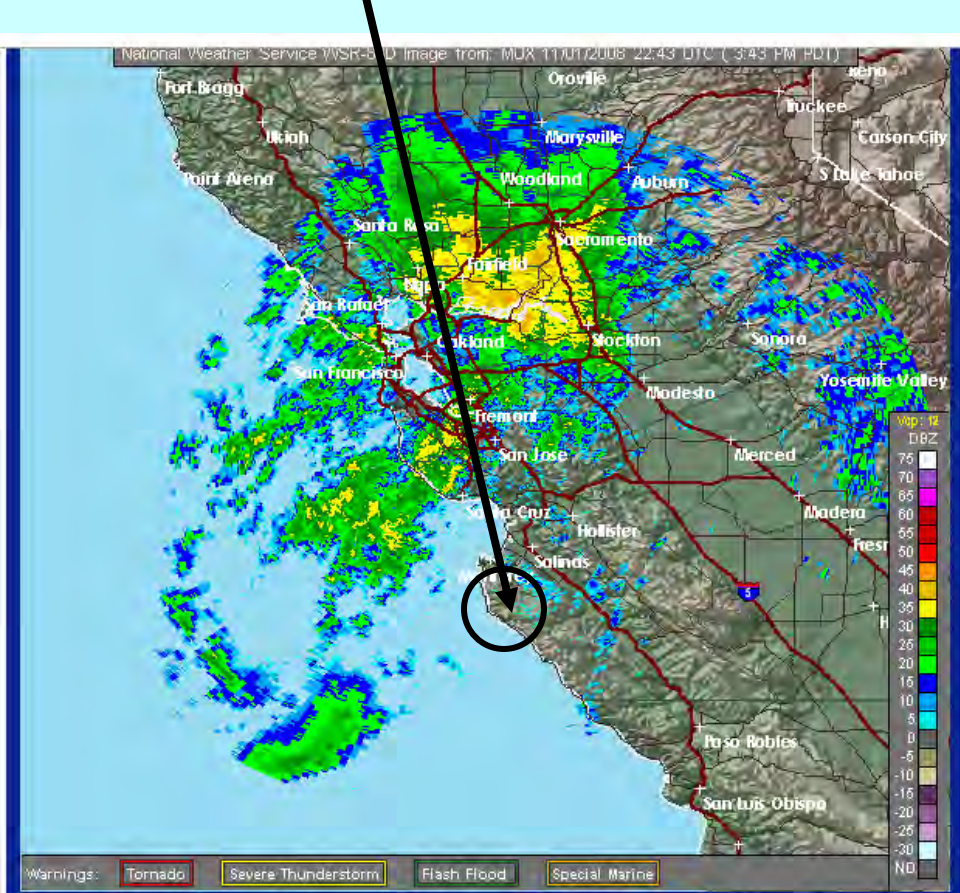


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Pt Sur rain gauge confirms  
Rainfall at the site (~1/4 inch)



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# Mudslide shuts down Big Sur Grange Hall; voting relocated

