



Earth System Research Laboratory

SCIENCE, SERVICE & STEWARDSHIP

Testbeds: Bridging the Gap Between Observing Systems and Predictions

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NOAA Earth System Research Laboratory

ESRL Dedication and Open House

August 23-24, 2006

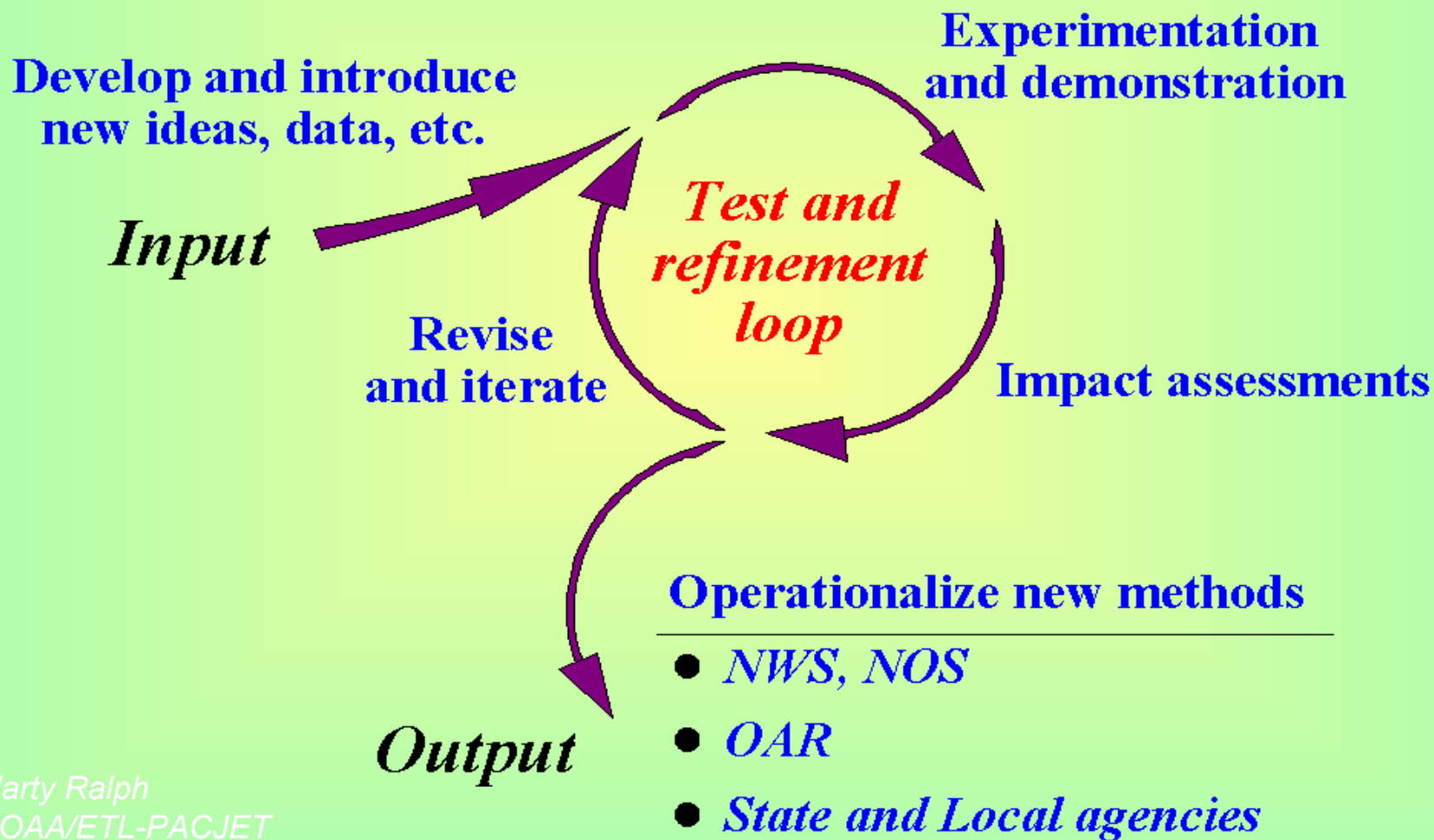


Collapse of the Aurburn, CA dam

18 February 1986



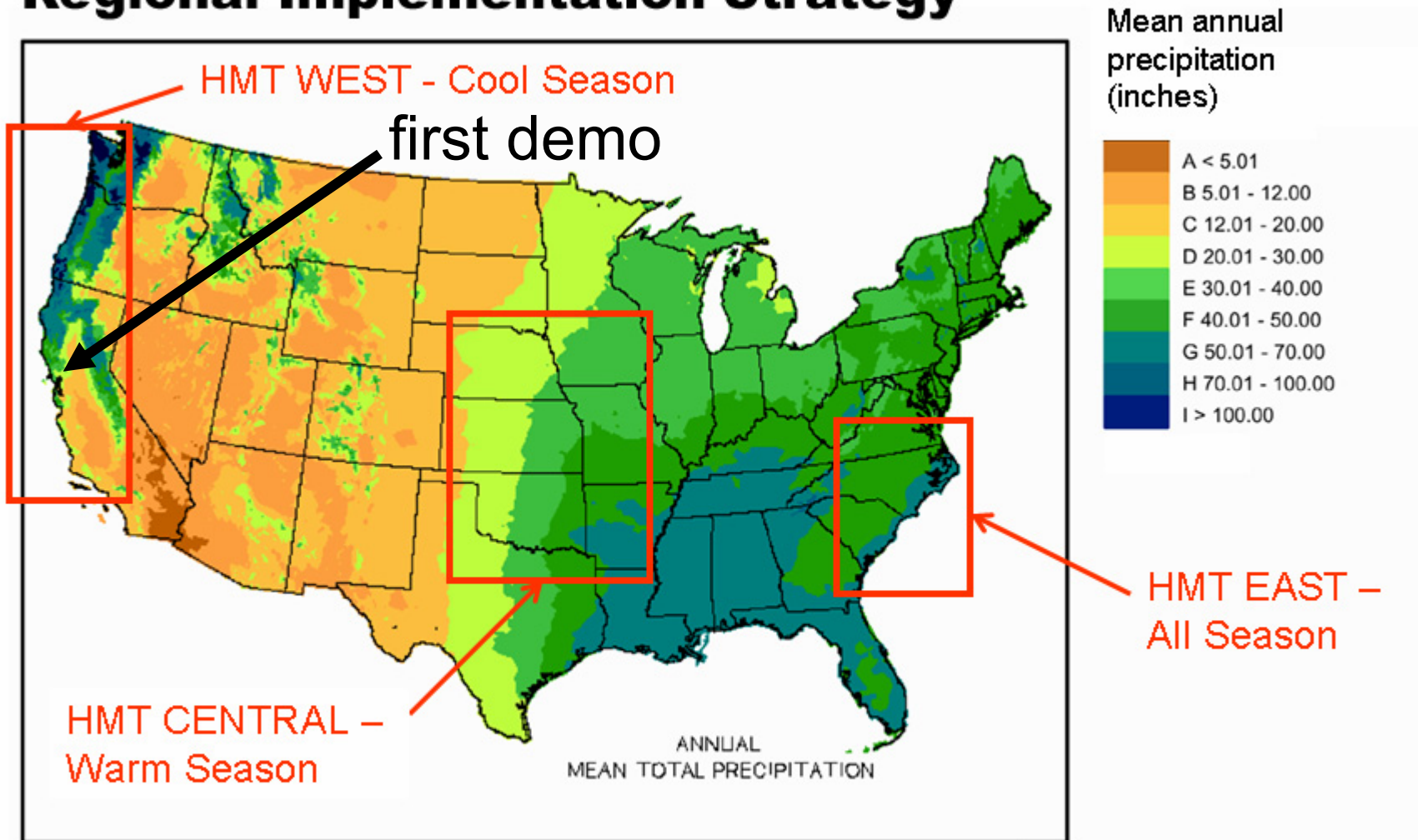
Testbed Concept as a Process



NOAA Testbeds

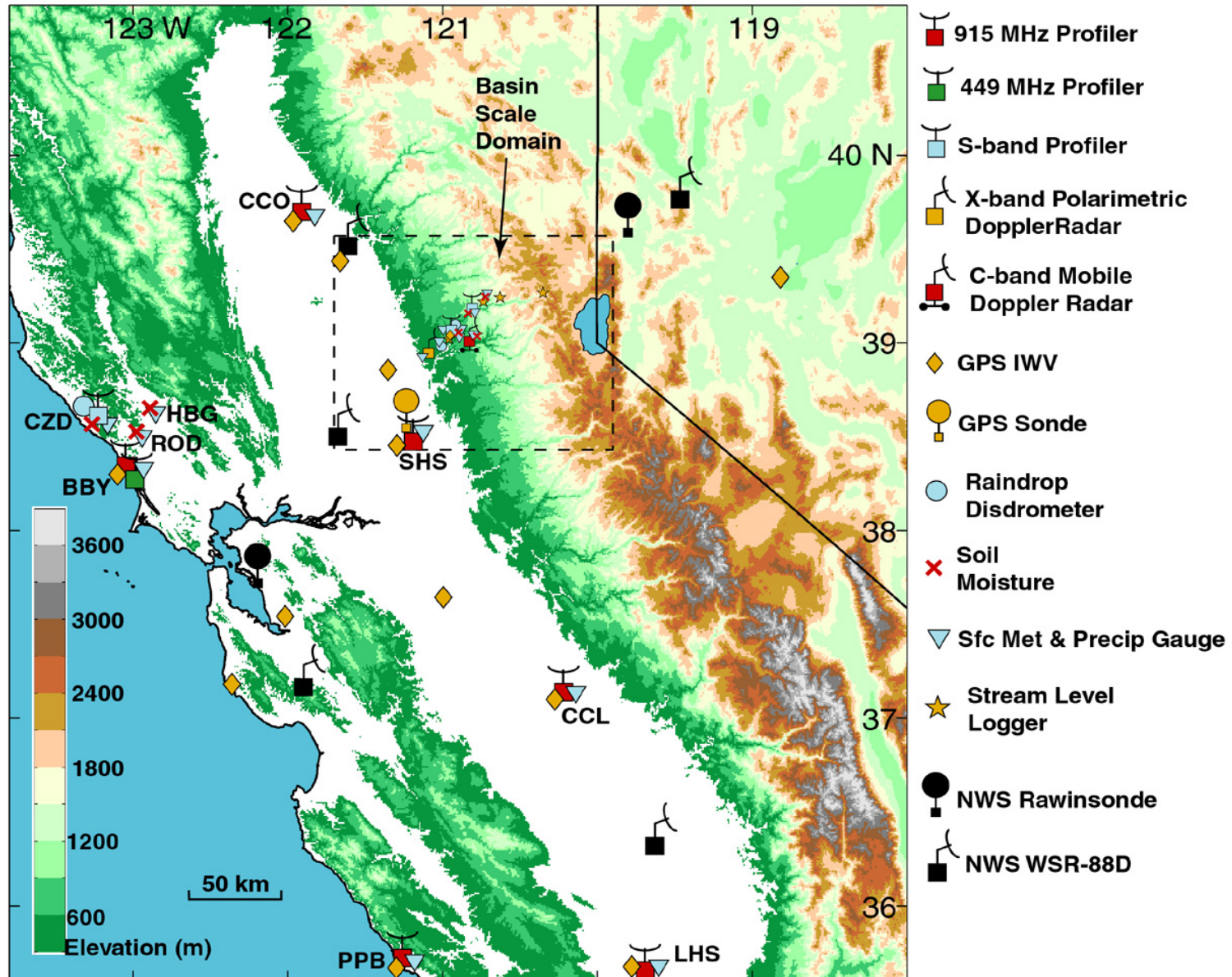
- Joint Hurricane Testbed (JHT)
- Hydrometeorology Testbed (HMT)
- Development Test Center (DTC) – WRF model
- Joint Center for Satellite Data Assimilation (JCSDA)
- High-Impact Weather Testbed (HIWT)
- Climate Testbed (CT)

NOAA Hydrometeorological Testbed (HMT) Regional Implementation Strategy



The national Hydrometeorological Testbed program will be implemented incrementally in different regions of the U.S.

HMT West: The American River Basin

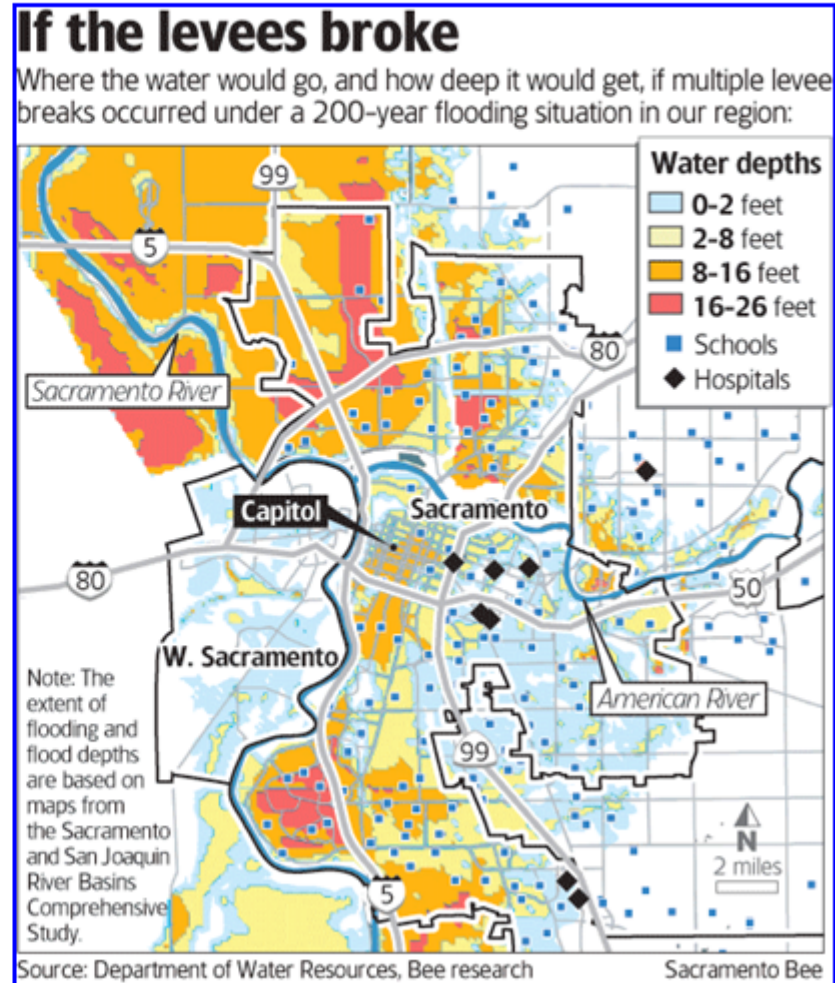


Why the American River Basin?

- Complex water resource management issues in an urban area with large societal impacts
 - Large demand for water/hydropower
 - Threat of devastating flood



Photo by Bryan Patrick, Sacramento Bee



Fort Ross, CA Instrumentation

X-band
radar
antenna



X-band
radar
trailer



S-band radar
and balloon
sounding
trailer



S-band
radar

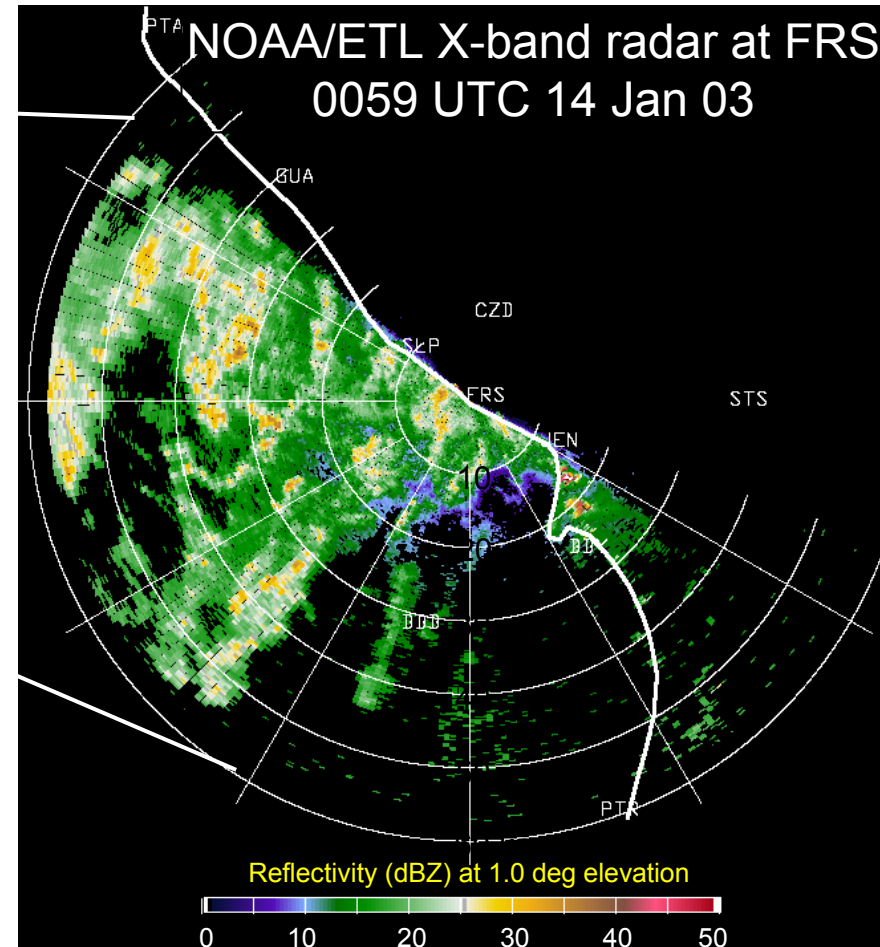
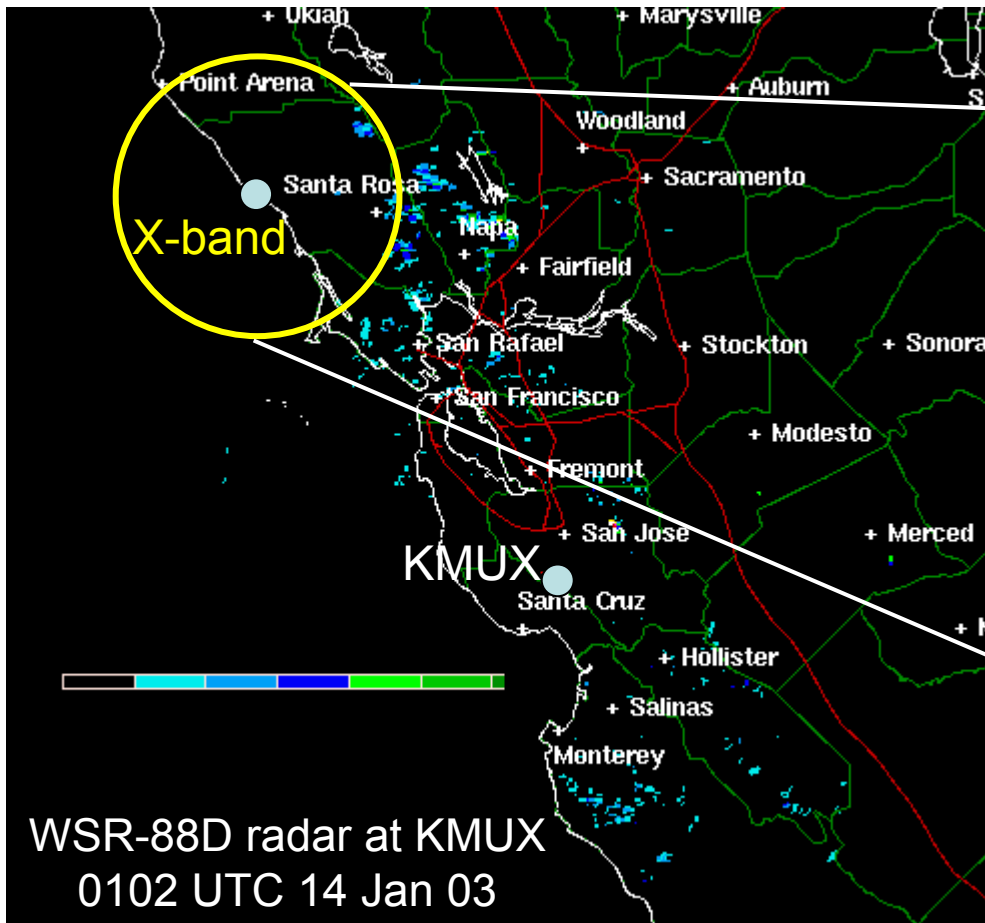
Diesel
generator



10-m
met.
tower



HMT-04: Coastal Gap-Filling X-band Radar

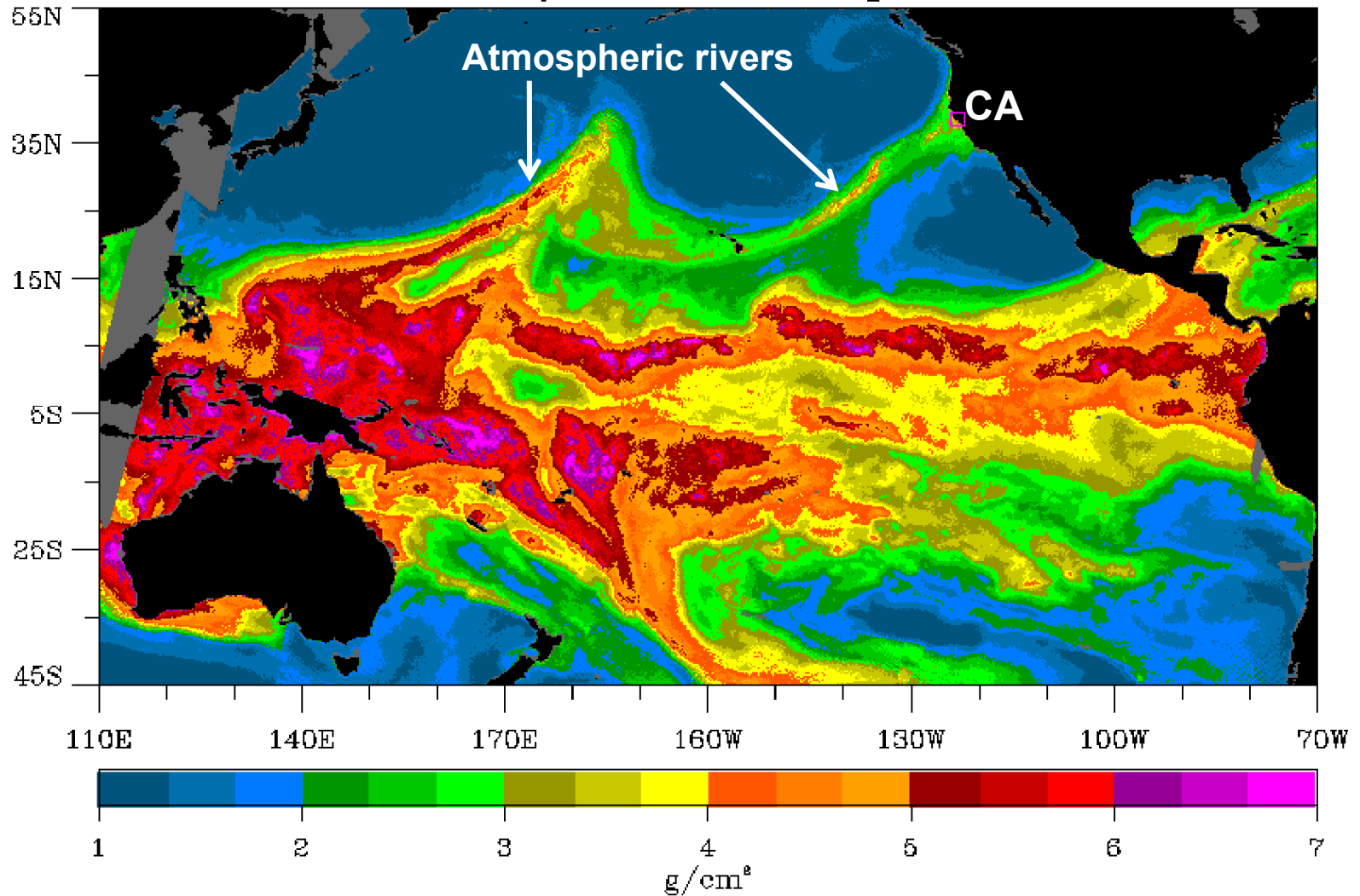


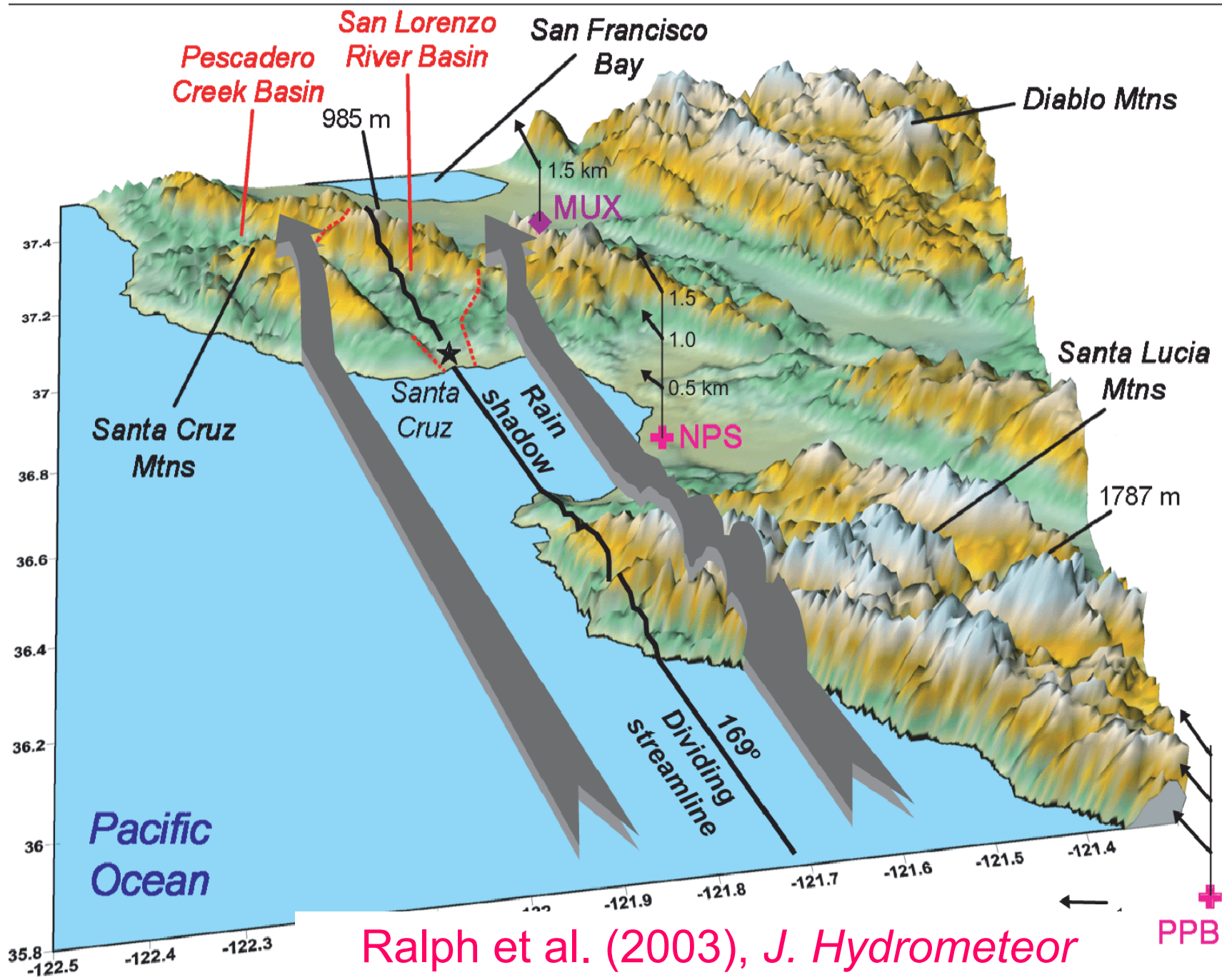
- Nearest NEXRAD radar sees no significant echoes approaching flood-prone watershed

- NOAA/ETL's Coastal X-band radar fills NEXRAD gap

HMT-West focuses on atmospheric rivers

SSM/I Water Vapor (Schluessel algorithm)
February 18, 2004 Descending Passes



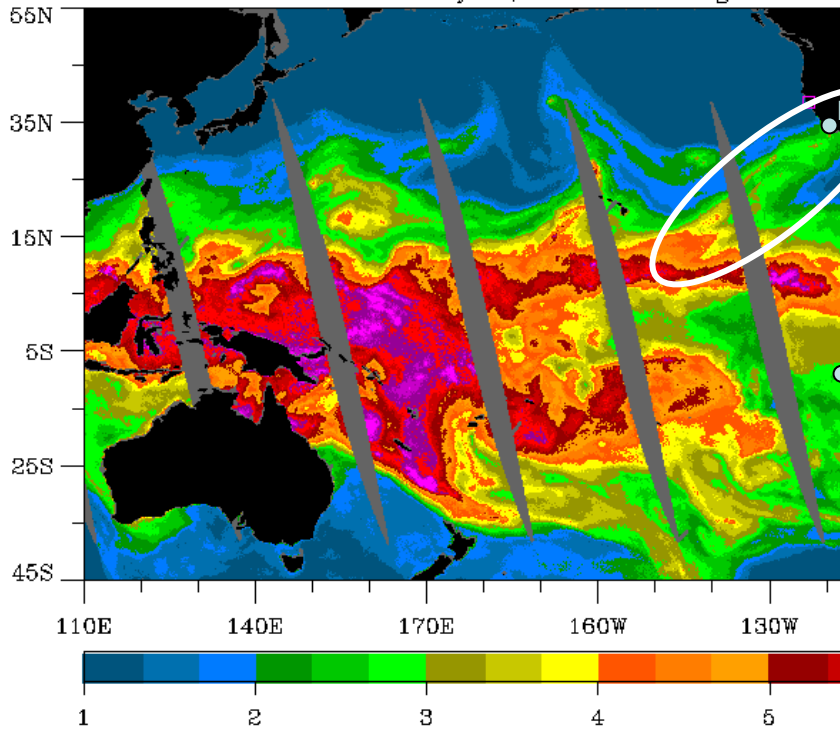


Ralph et al. (2003), *J. Hydrometeor*

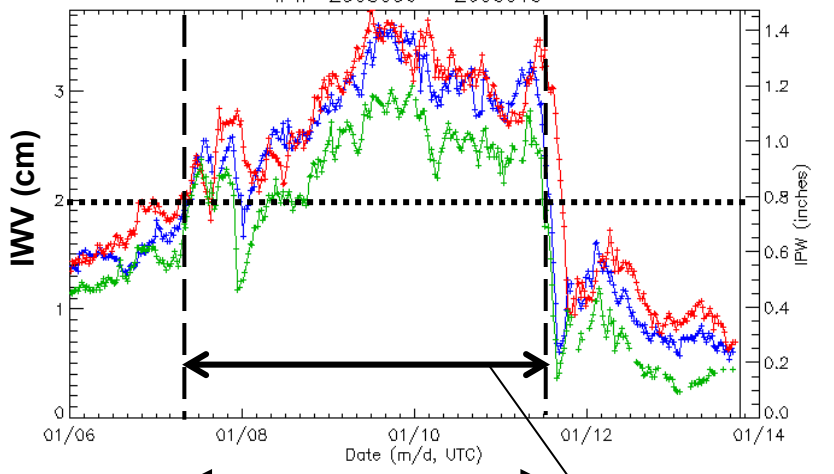
La Conchita, CA Debris-flow Disaster of 10-Jan-05

SSM/I Water Vapor (Schlüssel algorithm)
January 09, 2005 Ascending Passes

Atmospheric river on 9 Jan 2005



Fatal mudslides and floods on 10 Jan 2005



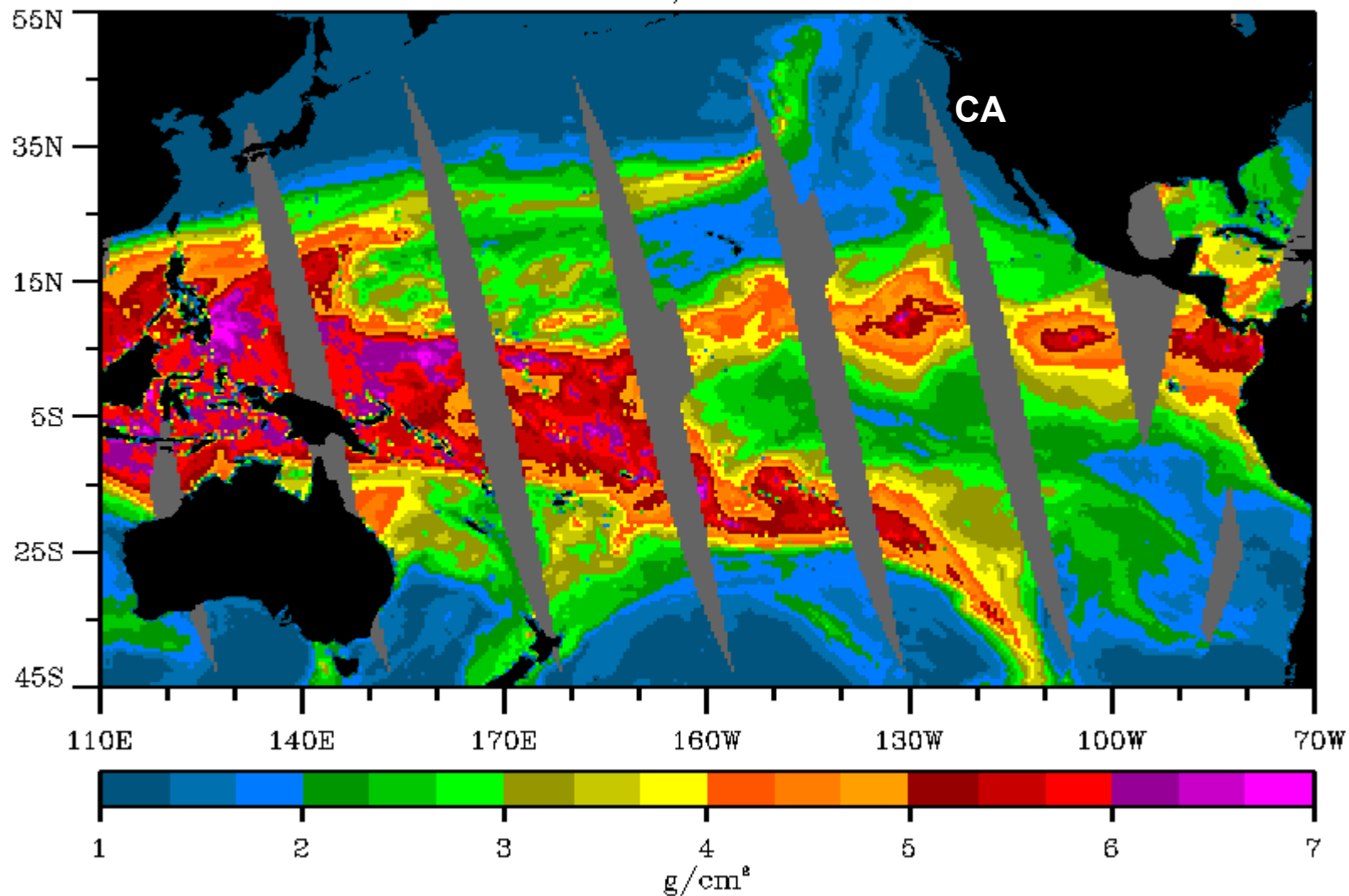
Atmospheric River

**GPS IWV traces coastal zone S. California
4-day duration of high IWV and heavy rains
2-3 ft of rain in San Gabriel Mtns foothills
Fatal mudslides**

SSM/I IWV satellite loop 15-Dec-2005 through 03-Jan-2006

Atmospheric rivers generated >30" of rain in California's coastal mtns & Sierras

SSM/I Precipitable Water
December 15, 2005 00-11 UTC



The NOAA Unmanned Aircraft System (UAS) Altair Demonstration Project

Project Managers: Michael Aslaksen and Sara Summers



Channel Islands National Marine Sanctuary, 16 Nov. 2005



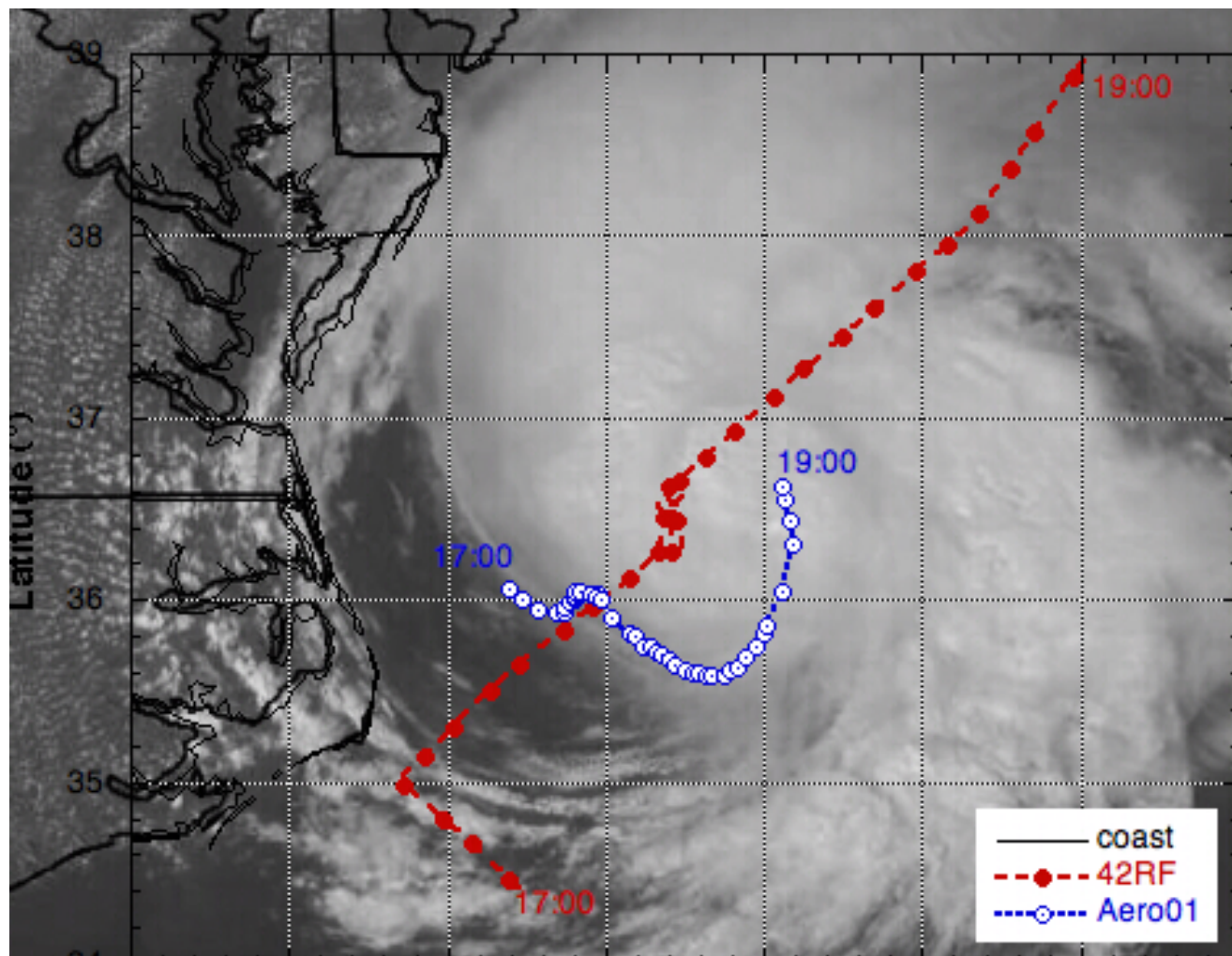
“Aerosonde” UAS in Tropical Storm Ophelia Sept 16th, 2005

Satellite image of Tropical Storm Ophelia (intensity = 55 kt), with flight tracks shown:

○ Aerosonde (blue)

● WP-3D (red)

Courtesy of Joe Cione and Frank Marks (OAR/AOML)



Testbeds Summary

- Testbeds are a new concept for quickly assessing the usefulness of new tools (instruments, models, research discoveries).
- Testbeds bridge traditional gaps between:
 Research and Operations
 Observations and Forecasting.
- Testbeds emphasize concentrated, *regional demonstrations*, followed by nationwide implementations of the most successful methods.