



NOAA RESEARCH • ESRL • PHYSICAL SCIENCES DIVISION

## Theme 4: Research to Applications, Operations and Services

### *Serving Stakeholders - Overview*

Laura Bianco

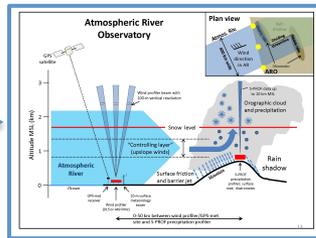
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Boulder, Colorado



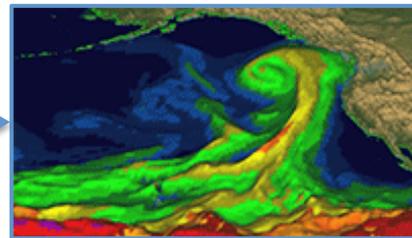
# Research to Applications, Operations and Services (R2X) Serving Stakeholders



Observe



Understand



Model



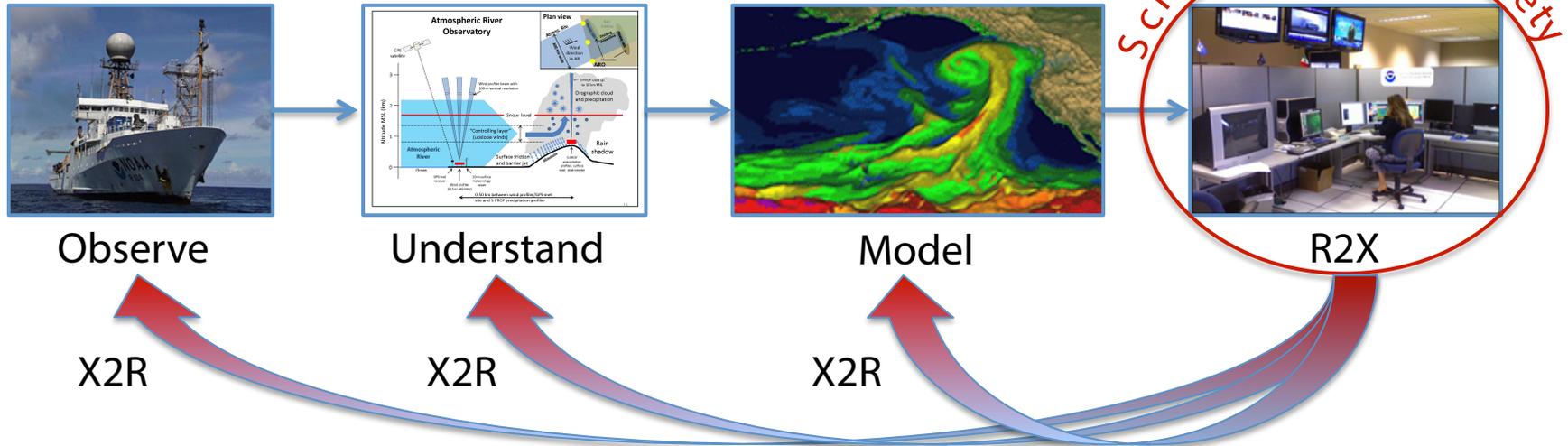
R2X

Science Serving Society

PSD represents NOAA priorities: Investing in Observational Infrastructure, Advancing Earth system and Ecosystem Modeling, Achieving Organizational Excellence, Providing Information and Services to make communities more resilient

	 U.S. Agency for International Development	 U.S. Army Corps of Engineers	 U.S. Department of Defense	 U.S. Department of Energy	
	 US Bureau of Reclamation	 State of California Department of Water Resources	 Sonoma County Water Agency	 National Integrated Drought Information System	

# Research to Applications, Operations and Services (R2X) Serving Stakeholders



Partner organizations and their logos:

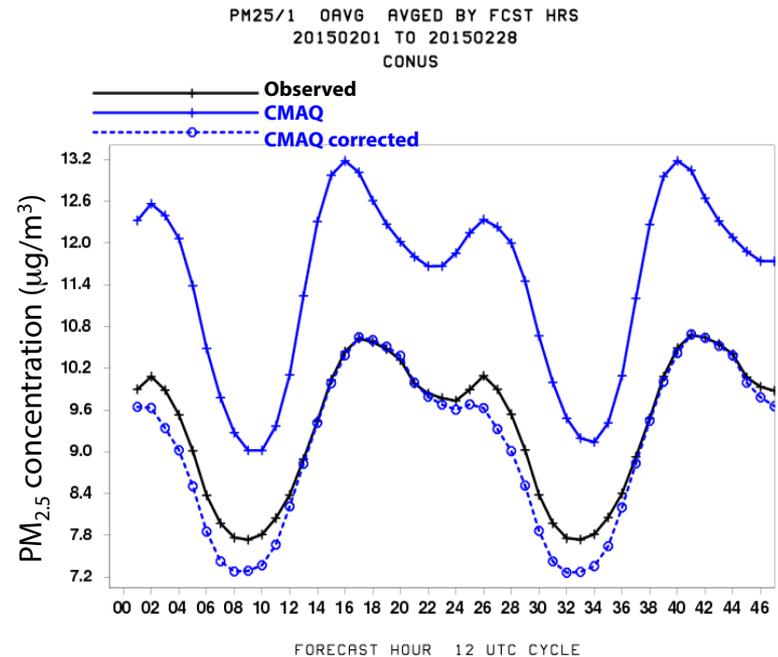
- USAID:** U.S. Agency for International Development
- U.S. Army Corps of Engineers:** U.S. Army Corps of Engineers
- U.S. Department of Defense:** U.S. Department of Defense
- U.S. Department of Energy:** U.S. Department of Energy
- NASA:** NASA
- U.S. Bureau of Reclamation:** U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF RECLAMATION
- State of California Department of Water Resources:** DEPARTMENT OF WATER RESOURCES, STATE OF CALIFORNIA
- Sonoma County Water Agency:** SONOMA COUNTY WATER AGENCY
- National Integrated Drought Information System:** NIDIS
- NOAA:** NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, U.S. DEPARTMENT OF COMMERCE

- NOAA Strategic Goal Addressed
  - ✓ Climate Adaptation and Mitigation
  - ✓ Weather Ready Nation
- NOAA Strategic Objectives
  - ✓ Improved **scientific understanding** of changing climate system and its impacts
  - ✓ Integrated **services** meeting the **evolving demands** of regional stakeholders
- NOAA 5-Year Objectives
  - ✓ **Improved observations** and **decision support tools** for the ultimate purpose of improving preparedness and response
- OAR Science Questions
  - ✓ What improvements to weather and climate predictions are possible?
  - ✓ What are the best observing systems to meet NOAA's mission?
  - ✓ How can modeling be best integrated and improved with respect to skill, and efficiency?
- PSD's 2010 Strategic Goal Addressed
  - ✓ Improve observations and understanding of Earth system processes
  - ✓ **Conduct research and develop prototypes to improve information and services**

# A successful example of how PSD research serves society

## Improving EPA Community Multi-scale Air Quality (CMAQ) Model

- The CMAQ modeling system is designed to provide air-quality forecast to prevent health-related problems
- PSD conducted research to correct the forecast of the Fine Particulate Matter ( $PM_{2.5}$ ), the deadliest form of air pollution, up to 38% in terms of RMSE
- This advanced Analog/Kalman-Filter bias-correction method code has been coded and transitioned to NCEP



Diurnal cycle of  $PM_{2.5}$  for February 2015

Courtesy of NCEP

*I. Djalalova et al., 2015, Atmospheric Environment*

## James Wilczak – “The Wind Forecast Improvement Projects: WFIP and WFIP2” (\*)

**Value-added information:** long term field campaigns aimed to better understand boundary-layer phenomena and to improve model forecasts in order to reduce renewable energy costs

**Technology transfer:** Instrument and operational model improvements (PSD-GSD collaboration) driven through public-private partnership readily available to stakeholders and the public

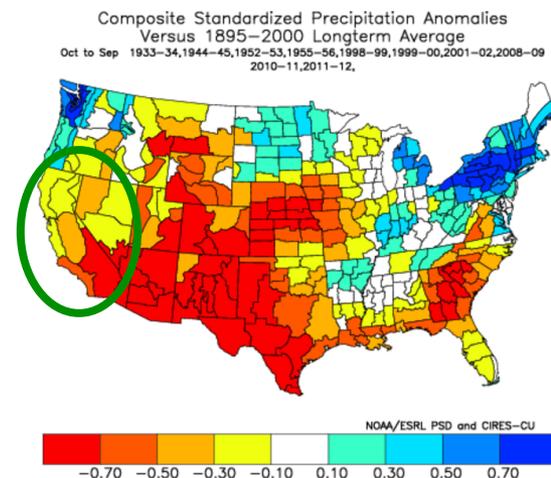
(\*) UVIG 2015 Achievement Award for WFIP



## Klaus Wolter – “Improving seasonal forecasts to help with drought planning in California”

**Value-added information:** PSD scientists work closely with NOAA Climate Prediction Center on seasonal forecasts, going beyond the general “ENSO paradigm” to address CA drought concerns.

**Partners:** California Department of Water Resources (DWR), National Integrated Drought Information System (NIDIS)



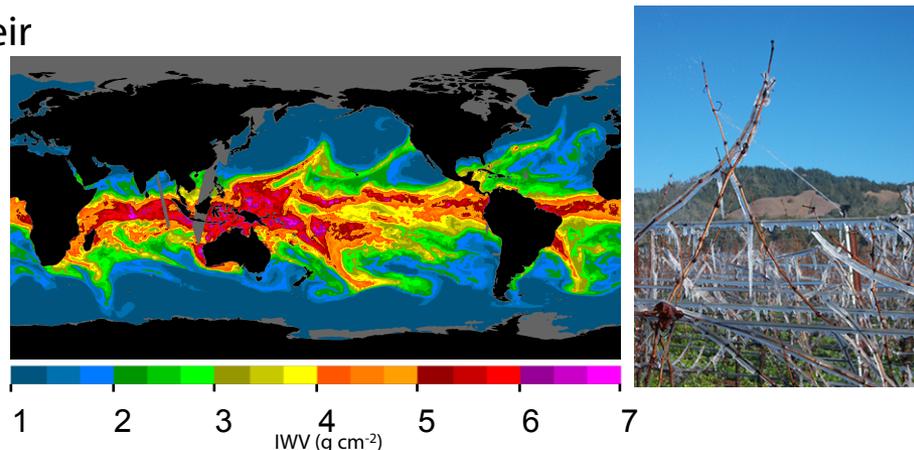
## Allen White – “Developing data tools and products in support of research to applications”

(\*) “Water vapor flux tool” awarded with Bronze Medal

**Value-added information:** PSD scientists use their expertise to create specialized data displays and tools (\*)

### Technology transfer:

- enhanced situational awareness
- decision support for NWS forecasters
- support to research in the government, academic, and private sectors

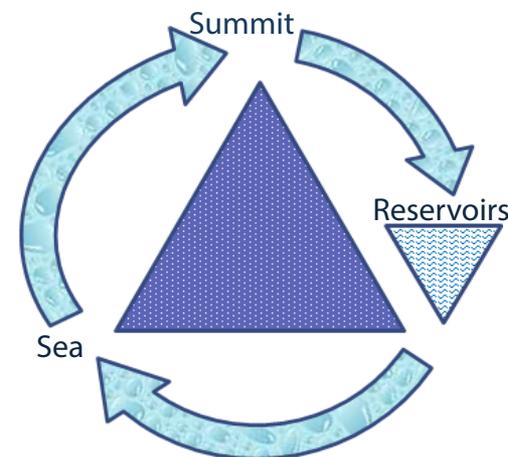


## Lynn Johnson – “A “Sea to Summit to Sea” approach to improve management of water resources”

**Innovation:** Integrated monitoring, analysis and prediction system aimed at increase water supply, reduce flood-damages, reduce combined sewer discharges, and enhance endangered fisheries habitat

**Added-value:** Forecast benefits assessment

**Partners:** San Francisco Bay Area stakeholders and collaborators



# What You Will Hear

*James Wilczak:* “The Wind Forecast Improvement Projects: WFIP and WFIP2”

*Klaus Wolter:* “Improving seasonal forecasts to help with drought planning in California”

*Allen White:* “Developing data tools and products in support of research to applications”

*Lynn Johnson:* “A "Sea to Summit to Sea" approach to improve management of water resources”