UNIVERSITY OF CALIFORNIA, SAN DIEGO
SCRIPPS INSTITUTION OF OCEANOGRAPHY
N E W S

AGU PRESS CONFERENCE / WORKSHOP: THURSDAY, DEC. 18, 10:30 a.m.

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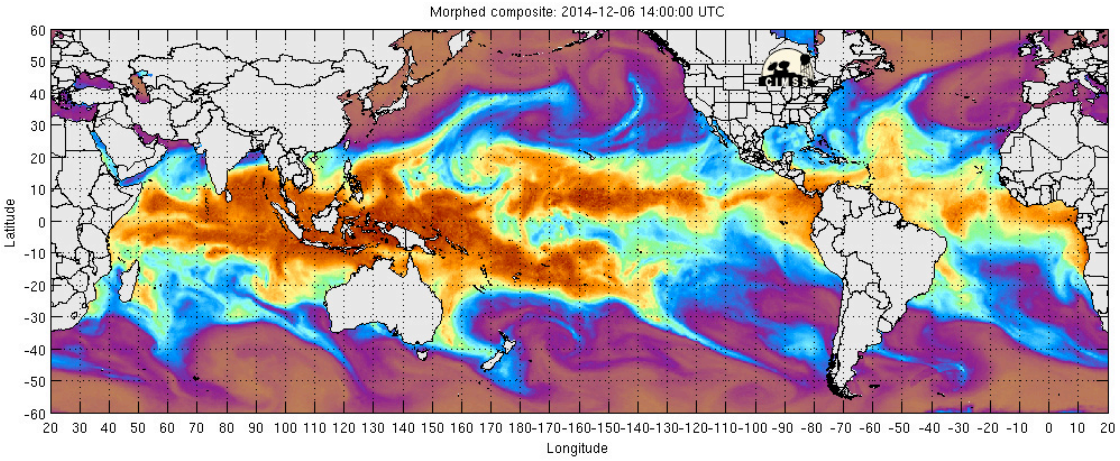
"Refilling California's Reservoirs—The Roles of Aerosols and Atmospheric Rivers"

Amid a season of "atmospheric river" storms, an upcoming field campaign promises to improve knowledge of the forces that produce or inhibit precipitation as California's drought continues

Scripps Institution of Oceanography/University of California, San Diego

As California enters another year of drought, scientists from Scripps Institution of Oceanography at UC San Diego, the Department of Energy's Pacific Northwest National Laboratory (PNNL), and NOAA will preview an upcoming field campaign in early 2015 that could accelerate scientists' understanding of the natural and human-caused phenomena that determine when and how the state gets its precipitation.



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The workshop to describe CalWater-2/ARM Cloud Aerosol Precipitation Experiment (ACAPEX), an interagency, interdisciplinary, field campaign starting in January, takes place at **10:30 a.m. Thursday, Dec. 18, at the Fall Meeting Press Conference Room (Room 3000, Moscone West, Level 3)**. CalWater2/ACAPEX mission scientists Marty Ralph and Kim Prather from UC San Diego, Ruby Leung from PNNL, and Chris Fairall from NOAA's Earth Systems Research Laboratory will discuss the campaign and accomplishments to date.

"This will be an extremely important study in advancing our overall understanding of aerosol impacts on clouds and precipitation," said Prather, who is a co-principal investigator on the portion of CalWater2/ACAPEX dealing with aerosols. "It will build upon findings from CalWater1, adding multiple aircraft to directly probe how aerosols from different sources, local, ocean, as well as those from other continents, are influencing clouds and precipitation processes over California."

"We are collecting these data to improve computer models of rain that represent many complex processes and their interactions with the environment," said PNNL's Leung, principal investigator of ACAPEX. "Atmospheric rivers contribute most of the heavy rains along the coast and mountains in the West. We want to capture those events better in our climate models used to project changes in extreme events in the future."

The key natural phenomenon of interest is called an atmospheric river (AR) – a veritable firehose of moisture channeled from the tropics to the U.S. West Coast. Where the AR hits the coast is where the precipitation occurs, but total accumulation and how much falls as rain as opposed to snow is influenced by aerosols.

The groundbreaking CalWater1 field campaign conducted in 2009-2011, which included research aircraft and ground-based sampling, has already yielded new insights into how precipitation processes in the Sierra Nevada can be influenced by different sources of aerosols that seed the clouds.

In terms of aerosols, mineral dust transported intercontinentally and biological particles possibly from the ocean were broadly shown to correspond to greater precipitation, while the heightened presence of aerosols produced by biomass burning and smog correlated with less precipitation. The upcoming experiment will use enhanced sampling at the coast and offshore to search for these processes "upwind" of the Sierra out over the Pacific Ocean and along the California coast.

The experiment offshore will observe the strength of ARs, which can transport water vapor in amounts 10-20 times the flow of the Mississippi River. It will also explore phenomena that influence the predictability of landfalling ARs and precipitation. These ARs produce up to 50 percent of California's precipitation. The role of evaporation from the ocean as an AR input as well as changes in the ocean after passage of an AR are also being studied.

The workshop takes place in the midst of December atmospheric river events that are anticipated to bring several inches of rain and snow to the West.

"The recent AR event that struck California provided some drought relief bringing major precipitation and flooding in Northern California," Ralph said.

This panel will describe how ground-based, multiple-aircraft, and ship-based measurements will help provide a better understanding of how California gets its rain and snow, how human activities are influencing precipitation, and how the new science provides potential to inform water management decisions relating to drought and flood.

RELATED PRESENTATIONS:

A33Q-02 • Wednesday, Dec. 17, 1:55 p.m.–2:10 p.m. • Moscone West 3006
Ryan Spackman, Marty Ralph, Kimberly Prather, Daniel Cayan, Paul DeMott, Michael Dettinger, Chris Fairall, Ruby Leung, Daniel Rosenfeld, Steven Rutledge,

Duane Waliser, Allen White "CALWATER 2 – PRECIPITATION, AEROSOLS, AND PACIFIC ATMOSPHERIC RIVERS EXPERIMENT"

A34E-01 • Wednesday, Dec. 17, 4 p.m.–4:15 p.m. • Moscone West 3006
Ruby Leung, Kim Prather, Marty Ralph, Daniel Rosenfeld, Ryan Spackman, Chris Fairall, Paul DeMott, Jiwen Fan, Chun Zhao "CALWATER 2 – ARM CLOUD AEROSOL PRECIPITATION EXPERIMENT (ACAPEX)"

A33Q-05 • Wednesday, Dec. 17, 2:40–2:55 p.m. • Moscone West 3006
David Lavers "ATMOSPHERIC RIVERS OVER EUROPE: HYDROLOGICAL IMPACTS AND PREDICTABILITY"

A33Q01 • Wednesday, Dec. 17 1:40 p.m.–1:55 p.m. • Moscone West 3006
Michael Dettinger "LANDFALLING ATMOSPHERIC RIVERS IN CALIFORNIA-HISTORICAL AND FUTURE IMPACTS"

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Note to broadcast and cable producers: UC San Diego provides an on-campus satellite uplink facility for live or pre-recorded television interviews. Please phone or e-mail the media contact listed above to arrange an interview.

Scripps Institution of Oceanography: scripps.ucsd.edu

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Scripps Institution of Oceanography, at UC San Diego, is one of the oldest, largest and most important centers for global science research and education in the world. Now in its second century of discovery, the scientific scope of the institution has grown to include biological, physical, chemical, geological, geophysical and atmospheric studies of the earth as a system. Hundreds of research programs covering a wide range of scientific areas are under way today in 65 countries. The institution has a staff of about 1,300, and annual expenditures of approximately $155 million from federal, state and private sources. Scripps operates one of the largest U.S. academic fleets with four oceanographic research ships and one research platform for worldwide exploration.

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