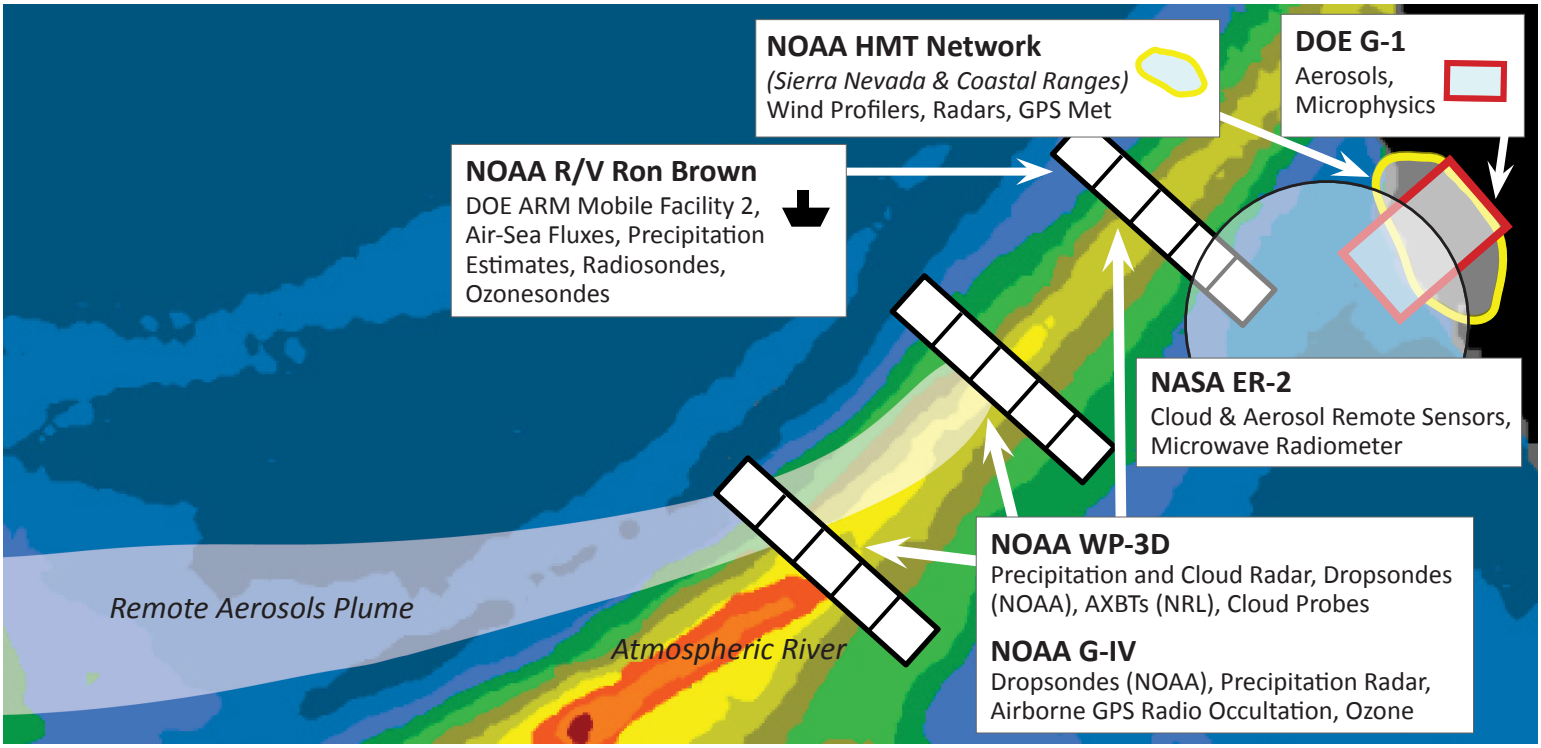
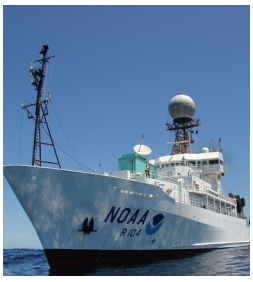
CalWater 2015

Precipitation, Aerosols, and Pacific Atmospheric Rivers Experiment








From **January to March 2015**, government and university forecasters, research scientists, and engineers participated in the **CalWater 2015** field campaign, which deployed state-of-the-art monitoring equipment on a research ship, airplanes, and at ground sites to study two phenomena that play key roles in water supply availability and the incidence of extreme precipitation events along the West Coast of the United States: *Atmospheric Rivers* and *Aerosol Impacts on Precipitation*.

Atmospheric Rivers

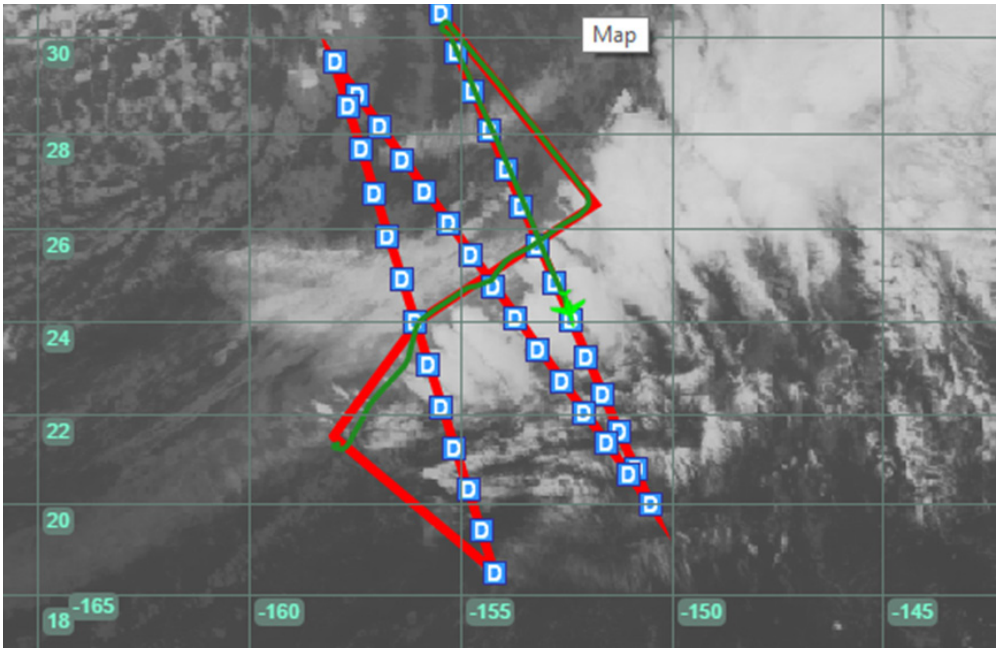
Atmospheric rivers (ARs) are narrow conveyor belts of water vapor that can extend thousands of miles. They are responsible for delivering much of the water vapor associated with major storms along the U.S. West Coast. Precipitation from ARs can provide beneficial water supply and snowpack as well as create conditions for dangerous floods that threaten lives and property.

Aerosol Impacts on Precipitation

Aerosols (such as dust and pollution) from local sources, as well as those transported from remote continents, can influence western U.S. precipitation. Aerosols interacting with atmospheric water vapor can enhance storm development through the formation of additional cloud droplets and also directly enhance or suppress precipitation.

How was this accomplished?

Researchers used a variety of methods and instruments to collect a comprehensive data set in environments where ARs develop, including how aerosols influence precipitation. Aircraft and ship-based measurements in the eastern Pacific and over California complemented observations already being collected at field sites across California through NOAA's Hydrometeorology Testbed (HMT).



Sample flight path of the NOAA G-IV aircraft and location of dropsonde drops into an atmospheric river over the Pacific Ocean.

The DOE Atmospheric Radiation Measurement (ARM) program committed airborne and shipborne facilities for this same period in a study called ACAPEX (ARM Cloud Aerosol and Precipitation Experiment), a complementary study to CalWater 2015.

In the air...

The NOAA P-3 and G-IV, NASA ER-2, and Department of Energy G-1 aircraft were each assigned specific instruments that measured temperature, relative humidity, wind speed and direction, cloud properties, aerosol chemistry, ozone, and even ocean temperature, among other things.

In the ocean...

Aboard the NOAA Research Vessel Ronald H. Brown, researchers operated NOAA and DOE instrumentation, and released weather balloons and ozonesondes to study the interaction between the ocean and atmosphere and how it influences ARs.

On the ground...

HMT ground sites contributed measurements of precipitation, winds, snowpack, soil moisture, snow level, and surface weather. Scripps Institution of Oceanography also installed additional instrumentation at HMT's Bodega Bay site to study aerosol chemistry.

What happens next?

The comprehensive air, ship, and land-based data collected from this experiment will be analyzed and used to help improve short- and long-term predictions of precipitation. The information will also be used to develop decision support tools for extreme precipitation events, hazard response, and water supply for more effective water resources management.

Partnership of:

National Oceanic & Atmospheric Administration (NOAA)

US Department of Energy (DOE)

Scripps Institution of Oceanography

National Aeronautics and Space Administration (NASA)

Naval Research Laboratory (NRL)

Contact:

Chris.Fairall@noaa.gov
303-497-3253

Ryan.Spackman@noaa.gov
303-497-7873

Allen.White@noaa.gov
303-497-5155

For more information, visit:

www.esrl.noaa.gov/psd/calwater

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