



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL WEATHER SERVICE

Forecast Office
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MEMORANDUM FOR: The Record

FROM: Todd Morris
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SUBJECT: California Weather Events of March 14-27, 2011

A series of severe winter storms, enhanced by atmospheric rivers¹, impacted the State of California beginning Wednesday March 14 and continued through March 27, 2011. The main weather impacts were extreme precipitation with low elevation heavy rain and high elevation snow. The storms also were responsible for strong winds, especially in the Central Valley and at higher elevations.

The series of storms are properly understood as being part of the same parent intense low pressure system which temporarily set up over the region for nearly two weeks with a persistently active jet stream and associated atmospheric rivers that meandered north to south and back again across the state. As the jet stream and atmospheric rivers meandered, the focus of the associated heavy precipitation shifted with never more than 2 days between heavy precipitation events in any one of the declaration areas of the state.

¹Atmospheric rivers, or ARs, are narrow regions in the atmosphere that transport large amounts of water vapor across the Pacific. In one day, an average AR transports an amount of water vapor equivalent to a foot of liquid water covering 10 million acres — an area roughly the size of Maryland. This is about seven and a half times the average daily flow of water from the Mississippi River into the Gulf of Mexico. As much as 40 percent of this water vapor is transformed into rain or snow. Another rainfall potential comparison would be that an AR is equivalent to the amount of moisture found in the eyewall of a landfalling hurricane if dissected and laid out end to end.

AR's were present in several recent California weather-related disaster declarations including December 2010(DR-1952), December 2004/January 2005(DR-1577), February 1998(DR-1203), January 1997(DR-1155), and February 1986(DR-758).

