



## **A Twenty-First-Century California Observing Network for Monitoring Extreme Weather Events**

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(Manuscript received 14 September 2012, in final form 10 May 2013)

### ABSTRACT

During Northern Hemisphere winters, the West Coast of North America is battered by extratropical storms. The impact of these storms is of paramount concern to California, where aging water supply and flood protection infrastructures are challenged by increased standards for urban flood protection, an unusually variable weather regime, and projections of climate change. Additionally, there are inherent conflicts between releasing water to provide flood protection and storing water to meet requirements for the water supply, water quality, hydropower generation, water temperature and flow for at-risk species, and recreation. To improve reservoir management and meet the increasing demands on water, improved forecasts of precipitation, especially during extreme events, are required. Here, the authors describe how California is addressing their most important and costliest environmental issue—water management—in part, by installing a state-of-the-art observing system to better track the area's most severe wintertime storms.

### 1. Introduction

Since the late 1990s, scientists from the National Oceanic and Atmospheric Administration (NOAA)'s Earth System Research Laboratory (ESRL) and their partners have been studying the winter storms that impact the U.S. West Coast each year. Beginning in 2004, this work was organized under the umbrella of NOAA's

Hydrometeorology Testbed (HMT-West; [hmt.noaa.gov](http://hmt.noaa.gov); Ralph et al. 2005; Morss and Ralph 2007). This paper describes a California HMT-Legacy project that has three main goals: 1) to install a twenty-first-century observing system to help address California's water and emergency management needs, 2) to provide a state-of-the-art numerical weather forecast model ensemble with a high-resolution nest over California, and 3) to develop decision support tools for weather and river forecasters and water managers. This project is part of the California Department of Water Resources (CA-DWR) Enhanced Flood Response and Emergency Preparedness Program.

The HMT-Legacy project is intended to help address some of the most extreme challenges that California faces regarding water and flood management in the face

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DOI: 10.1175/JTECH-D-12-00217.1