Advanced Quantitative Precipitation Information: Improving Monitoring and Forecasts of Precipitation, Streamflow, and Coastal Flooding in the San Francisco Bay Area

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Published-online: 26 Oct 2022

DOI: https://doi.org/10.1175/BAMS-D-21-0121.1

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Abstract

Advanced Quantitative Precipitation Information (AQPI) is a synergistic project that combines observations and models to improve monitoring and forecasts of precipitation, streamflow, and coastal flooding in the San Francisco Bay area. As an experimental system, AQPI leverages more than a decade of research, innovation, and implementation of a statewide, state-of-the-art network of observations, and development of the next generation of weather and coastal forecast models. AQPI was developed as a prototype in response to requests from the water management community for improved information on precipitation, riverine, and coastal conditions to inform their decision making processes. Observation of precipitation in the complex Bay Area landscape of California's coastal mountain ranges is known to be a challenging problem. But, with new advanced radar network techniques, AQPI is helping fill an important observational gap for this highly populated and vulnerable metropolitan area. The prototype AQPI system consists of improved weather radar data for precipitation estimation; additional surface measurements of precipitation, streamflow and soil moisture; and a suite of integrated forecast modeling systems to improve situational awareness about current and future water conditions from sky to sea. Together these tools will help improve emergency preparedness and public response to prevent loss of life and destruction of property during extreme storms accompanied by heavy precipitation and high coastal water levels - especially high-moisture laden atmospheric rivers. The Bay Area AQPI system could potentially be replicated in other urban regions in California, the United States, and world-wide.

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