

Survey of Atmospheric River, Precipitation Science, and Prediction

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The Center for Western Weather and Water Extremes fosters research and operations partnerships aimed at improving forecasts of landfalling atmospheric rivers (ARs) and their impacts across the western U.S. These partnerships include enhanced observations of ARs and their environments over the North Pacific as part of AR Reconnaissance (AR Recon) in collaboration with NOAA and the U.S. Air Force, and advancements in numerical modeling using a 200-member ensemble and machine learning/A.I. techniques to improve precipitation forecasts in collaboration with the California Department of Water Resources and the U.S. Army Corps of Engineers. The implications of these partnerships extend to applications such as Forecast Informed Reservoir Operations (FIRO) where more accurate forecasts can enhance water resources management strategies that influence water supply reliability and flood risk management. The purpose of this presentation is to (1) summarize recent results from a nationwide precipitation forecast skill assessment in support of FIRO, (2) provide examples from the AR Recon field campaign of the impact of enhanced observations on improving model forecasts of precipitation in the NCEP GFS model, and (3) provide examples from the CW3E's 200-member "West-WRF" ensemble skill in forecasting landfalling ARs and precipitation across the western U.S.