P65 Characterizing the distributions and sources of aerosols during atmospheric river landfall in the western U.S.

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Atmospheric rivers (ARs) are prominent features of the global water cycle. On long-term average, 20%–50% of annual precipitation over California is attributed to several AR events in the cool season that produce heavy precipitation. Local and trans-Pacific aerosols have been found to interact with ARs and affect clouds and precipitation along the US West Coast. The impacts of aerosols on precipitation are dependent on aerosol characteristics such as hygroscopity and size distributions linked to their chemical composition and origin so that local and long-range transported aerosols may modulate precipitation differently. In this study, a state-of-the-art model WRF-Chem is used to characterize the aerosol distributions and sources during AR events that made landfall in the western U.S. in 2010-2014. Quasi-global WRF-Chem simulations are evaluated with reanalysis and observations. The model simulations successfully capture the AR events and aerosol distributions in 2010-2014. During AR landfall in the cool season (September-March), a higher fraction of PM10 aerosol mass is associated with trans-Pacific aerosols than local aerosols compared to the average conditions, suggesting that the circulation patterns associated with ARs may enhance transport of aerosols across the Pacific Ocean. The aerosol vertical distributions and composition during AR landfall will also be analyzed to characterize the aerosols that interact with ARs and their potential influence on precipitation.