

## Orographic Precipitation: Exploring the response to microphysics and environmental parameter perturbations

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Atmospheric rivers (ARs) are responsible for 30-50% of the annual precipitation for the U.S. West Coast, mainly through mountain snowfall. When the moist nearly neutral flow associated with these ARs interacts with topography, complex interactions occur between the dynamics, thermodynamics, and cloud microphysics that make it difficult to disentangle the dominant controls on precipitation type, amount, and its location over a mountain. This seminar presents recent work exploring the sensitivity of clouds and precipitation to microphysical parameter perturbations using an idealized modeling framework. Results for the most influential microphysical parameters found in this case (i.e., snow fallspeed coefficient, snow particle density, ice-cloud water collection efficiency, and rain accretion) will be presented. Additionally, experiments are performed to test how an environment with a weaker wind profile and an environment with a lower freezing level impact the microphysical parameter perturbation results. In general, perturbations to microphysical parameters affect the location of peak precipitation, while the total amount of precipitation is more sensitive to environmental parameter perturbations. A preview of current work using the Morris screening method, which is a robust statistical tool allowing for simultaneous perturbation of numerous parameters, will also be shown. Overall these results highlight the complexity of the orographic precipitation response to microphysical parameter changes and suggests that a small subset of the total number of parameters are responsible for most of the microphysics-induced variability in orographic precipitation.

> This seminar will be webcast live at: http://ucarconnect.ucar.edu/live

Recorded seminar link can be viewed here: https://www.mmm.ucar.edu/events/seminars

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