Orographic Precipitation Processes along the Coast of Northern California

Orography has a profound influence on the intensity and spatial distribution of precipitation. Several observational field campaigns have been conducted over the last forty years to help clarify unresolved details about orographic precipitation processes. Most of these efforts have been focused on relatively large barriers, with half-widths exceeding 50 km and heights more than 2 km above upstream flat terrain. Smaller barriers, with half-widths and heights less than 50 km and 2 km, respectively, can also significantly influence the development of precipitation, particularly those on or near a coastline where sources of maritime moisture are unimpeded by upstream topography. In fact, precipitation in these orographic locales can lead to severe flooding that incurs hundreds of millions of dollars in property damage.

This presentation will highlight recent research on orographic precipitation processes along the coast and in the adjacent coastal mountains north of San Francisco. The research is based on observations from scanning and profiling Doppler radars, GPS receivers, balloon soundings, raindrop disdrometers, rain gauges and surface meteorology sensors collected during the California Land-Falling Jets (CALJET, 1998), Pacific Land-Falling Jets (PACJET, 2001-2002) and Hydrometeorology Testbed (HMT, 2003-2012) experiments conducted and supported by NOAA. These observations are used to examine both the forcing and cloud microphysics of orographic precipitation along the coast of northern California.

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