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### **Distribution of Liquid Water in Orographic Mixed-Phase Clouds**

The Colorado Airborne Mixed-Phase Cloud Study (CAMPS) was an experiment conducted in winter 2010-11 that sought to increase our understanding of mixed-phase clouds and their effects on climate using airborne radar, lidar, and a variety of in-situ measurements. Studies of mixed-phase clouds have been performed previously on other cloud types, such as Arctic stratiform clouds, but little work has involved orographic clouds, those formed by uplifting due to mountains. The results of CAMPS may aid in creating more accurate climate models as well as improving predictions of icing conditions, which can threaten the safety of air travel. This project is a study of an orographic mixed-phase cloud system, containing water in solid, liquid, and vapor phases, which occurred over Muddy Mountain in Wyoming during two days in February 2011. Using the University of Wyoming King Air research aircraft, measurements were obtained at a variety of altitudes, which provides useful information on the spatial and temporal variations within the cloud. This cloud system is an ideal case to study because it contains pockets of supercooled liquid water interspersed among pure ice clouds containing an assortment of ice crystal sizes, shapes, and concentrations. In particular, I have investigated the presence of liquid water pockets within the cloud and their relation to vertical wind speed, particle size distribution, and the physical structure of the cloud. The goal of this project is to explain the development of liquid water pockets in areas of updrafts, as well as the effects this process has on the particle size distribution, overall structure of the cloud, and ultimately, on the amount of snowfall produced beneath the cloud.