Abstract View

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Improvement of Microphysical Parameterization through Observational Verification Experiment

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ABSTRACT

Despite continual increases in numerical model resolution and significant improvements in the forecasting of many meteorological parameters, progress in quantitative precipitation forecasting (QPF) has been slow. This is attributable in part to deficiencies in the bulk microphysical parameterization (BMP) schemes used in mesoscale models to simulate cloud and precipitation processes. These deficiencies have become more apparent as model resolution has increased. To address these problems requires comprehensive data that can be used to isolate errors in QPF due to BMP schemes from those due to other sources. These same data can then be used to evaluate and improve the microphysical processes and hydrometeor fields simulated by BMP schemes. In response to the need for such data, a group of researchers is collaborating on a study titled the Improvement of Microphysical Parameterization through Observational Verification Experiment (IMPROVE). IMPROVE has included two field campaigns carried out in the Pacific Northwest: an offshore frontal precipitation study off the Washington coast in January–February 2001, and an orographic precipitation study in the Oregon Cascade Mountains in November–December 2001. Twenty-eight intensive observation periods yielded a uniquely comprehensive dataset that includes in situ airborne observations of cloud and precipitation microphysical parameters; remotely sensed reflectivity, dual-Doppler, and polarimetric quantities; upper-air wind, temperature, and humidity data; and a wide variety of surface-based meteorological, precipitation, and microphysical data. These data are being used to test mesoscale model simulations of the observed storm systems and, in particular, to evaluate and improve the BMP schemes used in such models. These studies should lead to improved QPF in operational forecast models.

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