



COPS and D-PHASE: QPF research in low-mountain regions on precipitation statistics, predictive skills of models, and high-impact weather events

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This presentation gives an overview of results on QPF achieved during the Convective and Orographically-induced Precipitation Study (COPS). COPS is a WWRP Research and Development Project (RDP) dedicated to improving QPF in low-mountain regions and for studying the predictability of heavy precipitation events. In collaboration with the WWRP Forecast Demonstration Project (FDP) D-PHASE, new high-quality statistics of atmospheric variables such as precipitation during the COPS observations period in summer 2007 in southwestern Germany/eastern France have been derived. These data are essential for process studies and model verification. For instance, the predictive skill of an ensemble of state-of-the-art mesoscale models can be studied using advanced skill scores. The results show strong remaining systematic errors in the simulation of thermally-induced flows and the 3D distribution of humidity.

Case studies are particularly useful for investigating the key processes leading to heavy precipitation. A high-impact precipitation event is investigated during IOP4b on June 20, 2007. During this case, strong interaction between large-scale instabilities, mesoscale forcing, and low-level forcing caused by thermally induced orographic flows was present. Late in the afternoon, constructive interference between these forcing mechanisms took place leading to the development of a mesoscale convective system with heavy precipitation. This case is presented and discussed in detail at the conference. Conclusions concerning the predictability of heavy precipitation in low-mountain ranges are given. Suggestions are made for the development of suitable ensemble forecast systems being able to capture these events with acceptable QPF skill.