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# Snow in the desert – measuring and modeling precipitation in an extreme environment

Elisabeth Schlosser (1), Barbara Stenni (2), Mauro Valt (3), Anselmo Caganti (3), Jordan G. Powers (4), Kevin W. Manning (4), and Michael G. Duda (4)

(1) University of Innsbruck, Meteorology and Geophysics, Innsbruck, Austria (elisabeth.schlosser@uibk.ac.at), (2) Department of Geosciences, University of Triest, Triest, Italy, (3) Avalanche Center Arabba, Arabba, Italy, (4) Earth System Laboratory, National Center of Atmospheric Research, Boulder, CO, USA

Measuring precipitation in Antarctica remains a challenge that has been accepted only in a few cases. In coastal areas, precipitation events are usually accompanied by high wind speeds, which makes it very difficult to distinguish between blowing/drifting snow and falling precipitation. In the interior of the continent, wind speeds are lower, but the extreme small amounts of precipitation considerably complicate the measurements. A further uncertainty is the amount of precipitation due to the local cycle of sublimation and deposition. However, at the French-Italian wintering base Dome C, daily precipitation measurements have been carried out since 2006, representing the only multi-year precipitation series of continental Antarctica. Even though error possibilities are large, it is possible to clearly distinguish between diamond dust and synoptic precipitation, the latter yielding amounts approximately one order of magnitude higher than the first. The measured data are compared to AMPS (Antarctic Mesoscale Prediction System) archive data. AMPS employs the Polar WRF (Weather Research and Forecasting Model), a mesoscale model especially adapted for polar regions. The model generally overestimates precipitation amounts, partly due to a warm bias in air temperature. However, in most cases it clearly represents precipitation events that are also marked by an increase in air temperature and wind speed, sometimes also by a decrease in surface pressure. Using observed precipitation and model fields, the synoptic situations of the precipitation events are investigated. A better understanding of precipitation processes in Antarctica is necessary for both mass balance studies and a correct paleoclimatic interpretation of ice core data.