Investigation of precipitation with a vertical pointing X-band radar at Hornisgrinde during COPS

Andreas Behrendt¹, Sandip Pal¹, Marcus Radlach, Andrea Riede¹, Volker Wulfmeyer¹
Martin Hagen², Jan Handwerker³ and Donat Högl⁴

¹Institute of Physics and Meteorology, University of Hohenheim, Stuttgart, Germany
²German Aerospace Center, Oberpfaffenhofen, Weßling, Germany
³Institut of Meteorology and Climate Research, Forschungszentrum Karlsruhe, Germany
⁴Eidgenössische Technische Hochschule, Zürich, Switzerland

A vertically pointing X-band Doppler radar was deployed from June to August 2007 COPS on top of Hornisgrinde, the highest peak in the Northern Black Forest with an elevation of 1161 m above sea level. The COPS Super site H (Hornisgrinde) lay along one line with the two Supersites R (Rhine valley) and M (Murgtal). This line was covered with one scan of the DLR polarization radar POLDIRAD.

The X-Band Radar has high resolution in time (1 s), one scan of the DLR polarization radar POLDIRAD. Additional a Joss-Waldvogel Disdrometer is mounted on the roof of the radar van to measure the rain rate and the drop size distribution.

Measurements during COPS 2007

Doppler spectra of 20:30 (upper panel) and 21:00 UTC (lower panel). The spectra are averaged over 10 s.

Comparison with POLDIRAD and IMK C-Band Radar during IOP 15b, 13 August 2007

Reflectivity of a rain event on 13 August 2007 as seen by the vertical pointing X-band radar on Hornisgrinde.

Disdrometer

Rain rate measured with the disdrometer of the X-band radar. First rain drops are detected at 00:22 UTC. As maximum rain rate 46.9 mm/h are found at 00:30 UTC. These features are found remarkably well also in the data of POLDIRAD and the IMK C-Band Radar.

POLDIRAD

Reflectivity data of POLDIRAD. Upper panels: Range-height-indicator scans in the direction of the supersites R, H, and M. Lower panels: Plane-polar indicator scans. The location of Hornisgrinde is marked. (Plots by courtesy of Martin Hagen)

IMK C-Band Radar

Rain events derived from reflectivity data measured with the C-Band radar of the Institute of Meteorology and Climate Research (IMK) Research Center Karlsruhe/University of Karlsruhe at the same time. The location of Hornisgrinde is marked. (Plots by courtesy of Jan Handwerker)

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