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FM-CW micro rain radar MRR-02

Instrument name: MRR-02
Instrument type: MRR-1
Manufacturer: Meteorologische Messtechnik GmbH (METEK)
Location: Erftverband, Bergheim
Coordinates: Lat: 50.960517° N, Lon: 6.631733° E, Alt: 69 m asl

The **M**icro **R**ain **R**adar (MRR) is a vertical pointing FM-CW (frequency modulated – continuous wave) Doppler radar operating at 24.1 GHz (K-band, 12.4 mm wavelength). The emitted radar signal (only 50 mW transmitting power) is backscattered by falling hydrometeors (rain, graupel, snow). From the Doppler spectra the radar reflectivity factor (Ze) and the terminal fall velocity distribution can be derived. The range resolution can be varied from 10 to 200 m which determines together with the 30 range gates the system's maximum height range of 300 - 6000 m. In case of rain the Doppler spectra can be used to derive vertical profiles of microphysical rain properties like drop size distribution and rain rate.
The **MRR-02** is located on the roof of the Erftverband in Bergheim.

Instrument specifications

Parameter	**Specification**
Frequency	24.1 GHz
Wavelength	12.4 mm
Radar Type	FM-CW
Transmit Power	50 mW
Receiver	Single Polarization
Power consumption (radar)	25 W
Total power cons. incl heating	525 W
Max. range	6 km
Range Resolution	10 - 200 m
No. of range gates	30
Temporal resolution	10 s
Antenna diameter	0.5 m
Beam width (2-way, 6 dB)	1.5°

Instrument time-line

17/12/2008 - today operation at Erftverband, Bergheim

Available measurement modes

- Vertical pointing FM-CW Radar at 30 range gates between 10 m and 200 m and a temporal resolution of 1 minute

JOYCE-CF Standard Operation Procedures

- Range gate spacing of 200 m with 1 min temporal resolution

Data quality assurance procedures

- Internal data processing via METEK GmbH MRR processor

Available datasets

The following data products are available via JOYCE-CF data request sheet.
Due to data storage amount and transmittance limitations, level 0 (raw pulses, etc.) and level 1 (I/Q data) are not stored. Only processed level 2 data is available.

Level 2

- Available data per scan:
    - measurement height H (m)
    - liquid water content LWC (g m^{-3})
    - path integrated attenuation PIA (dB)
    - rain rate RR (mm h^{-1})
    - transfer function TF (dimensionless)
    - fall velocity W (m s^{-1})
    - radar reflectivity attenuation corrected Z (dBZ)
    - attenuated radar reflectivity z (dBZ)

- Resolution:
    - Temporal resolution: approx. 1 min
    - Beam width: 2 deg
    - range resolution: 10 m to 200 m
- File size per day approx. 35 MB

Contact

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