The Ka-band radar MIRA36: Experiences from ten years of operation and current applications

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In November 2003 the 35 GHz pulsed, polarimetric Doppler radar MIRA36 was installed at the Observatory Lindenberg for continuous measurements of cloud parameters. It was the first system of a new type of Ka-band radars using a powerful magnetron transmitter, which results in high sensitivity with excellent range(≤ 30 m) and time resolution (≤ 10 s). Motivated by the tenth anniversary of continuous operation, the paper will report on system stability and reliability as well as on data usage.

The radar is characterized by a high reliability and low maintenance efforts. Downtimes of longer than one month were only caused by system upgrades and modifications. The effective operation time is about 90% while the mean time between hardware failures amounts to about 250 days. The calibration accuracy has been estimated by taking into account the gain and loss of all radar components to be 1.3 dB for non-precipitating conditions. Long term time series of reflectivity confirm this accuracy.

Macro- and microphysical cloud parameters are operationally derived either by a simple combination of radar and ceilometer measurements or by the more sophisticated and well- established synergy methods of Cloudnet. These value-added cloud products have been used to validate and modify the cloud parameterization of the German NWP model COSMO-EU as it will be illustrated.