



Comparison of lightning polarity and amplitude measured by a regional SAFIR network to operational BLIDS data

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Since 2003, the Institute for Meteorology and Climatology of the Leibniz University of Hannover (IMUK) operates a regional SAFIR (Surveillance et Alerte Foudre par Interférométrie Radioélectrique) lightning detection network in Northern Germany. It consists of three detection stations that form a triangle of about 180 km side length.

Lightning is detected simultaneously at two different frequency bands: The VHF antenna measures intra-cloud (IC) activity whereas the LF antenna detects signals from cloud-to-ground (CG) lightning. For both lightning types the location accuracy is better than 1 km in an area of roughly 270 km x 280 km around the network. Lightning activity is located via determination of the incidence direction of electromagnetic signals and triangulation of simultaneous events.

The operational lightning detection network BLIDS (BLitzInformationsDienst von Siemens) uses LPATS (Lightning Positioning and Tracking System) sensors and time-of-arrival techniques to locate (mostly CG) lightning.

An LF calibration of the SAFIR sensors of the IMUK was performed with the help of a user tool provided by the manufacturer Vaisala. A close inspection of the data revealed that major noise sources are present in the area. Their characteristics within the VHF data and strategies for their elimination were investigated. Peak amplitude and polarity of CG flashes provided by the SAFIR LF antennas (after calibration) were compared to the BLIDS data. Daily, monthly as well as the overall peak amplitude frequency distributions show comparable structures. Likewise daily cycles of peak amplitudes of

CG flashes turned out to be similar. The existing difference in the total numbers of CG flashes detected by both systems strongly depends on the measured peak amplitude. The difference is found to be greatest at peak amplitudes lower than 40 kA.