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On the discrimination between cloud lightning and cloud-to-ground strokes using different techniques

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In 2005 the Department of Physics at the University of Munich operated a VLF/LF lightning detection network (LINET) which exhibits relatively small baselines below 100 km in Southern Germany. Routinely, a 3D time-of-arrival method was used to identify cloud lightning (IC). This contribution examines some of the obtained results and compares with different observation techniques.

First, entire signal trains were evaluated based on generally accepted features characteristic for IC-type events. Second, signals were selected which show peaks due to ionospheric and ground reflections and, when recorded by several sensors at different distances from the lightning, allow determination of the height of both IC-emission and ionosphere. Third, in a more statistical analysis, extracted IC heights have been compared with 3D-radar scans in order to test whether the IC locations are compatible with the measured convective zones.

Examples are presented for the spatial and temporal progression of singular IC events occuring as parts of massive IC discharges. Continuous recordings containing abundant successive IC-waveforms are shown which have been used for 3D-localization.