The ZEUS lightning detection system in the frame of FLASH project

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Accurate and timely detection of lightning discharges is recognized worldwide as a key factor for better understanding of convection and associated electric phenomena. Since 2005 the National Observatory of Athens (NOA) operates the ZEUS long-range lightning detection network with six receivers installed across Europe. ZEUS receivers record the radio noise (sferics) emitted by lightning discharges in the very-low-frequency regime (7-15 kHz).

The first part of this study focuses on the assessment of ZEUS detection efficiency and location error over Southern Germany based on the intercomparison of ZEUS and LINET data for a period of a full year. The University of Munich network (LINET) utilizes the low/very low frequency range (LF/VLF), applies a 3-D capability in its central areas, and permits to monitor in real time the total lightning activity over large parts of Europe.

The second part of the study investigates the possible relationship between lightning and elevation, terrain slope and vegetation. The analysis showed that during spring and summer there is a positive relationship of lightning activity with elevation. The lightning activity was found to be positively correlated with the elevation slope throughout the year except winter. As it concerns the vegetation cover it was found that over bareground the lightning activity is low during the whole year while the inverse is true for woodland areas. During the warm period of the year, due to drying of the Mediterranean surfaces, the forested and wooded areas that keep soil moisture present increased lightning activity.