Lightning Detection in Europe

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A new lightning detection network (LINET) has been developed at the University of Munich which exhibits a number of advantageous features: it measures very weak lightning events, reports discharges in clouds, and locates cloud-to-ground strokes with an average accuracy of about 200 m (the statistical error is $\sim$100 m)provided that site errors are compensated. Tests of the system have been carried out in four continents (Germany, Brazil, Australia, Africa) along with scientific campaigns of DLR (Institute of Atmospheric Physics, Oberpfaffenhofen, Germany). Since May 2006, European lightning data is delivered to the German Weather Service on an operational basis (powered by NowCast mobile GmbH, Germany). Using 65 lightning sensors in 12 countries, an area from longitude 7˚W - 26˚E to latitude 40˚ - 59˚ is covered. Another 20 sensors are deployed during 2007 in order to enhance pick-up of weak signals. Further expansion is in the planning stage involving new LINET sensors in Italy, Spain, Croatia, and other (near-) Mediterranean countries, to be set up in 2008, so that high efficiency can be reached in the southern part of the network.

A number of scientific co-operations are carried out and are intended to combine lightning with other meteorological data sources and, thus, to exploit the potential of high-quality lightning data. For example, LINET will be used together with data from the DLR radar (POLDIRAD) for the development of improved nowcasting of thunderstorms, especially of severe weather conditions. A particular study of this type is aimed at the improvement of nowcasting for airports. Another international campaign concerns COPS (convective and orographically-induced precipitation study), under way in the South-West of Germany and East of France. In these and further studies it is helpful to have reports not only on ground strokes, but also on the electrical activity in the clouds; the latter data source has not been available in large networks and may provide useful information about the development of severe weather and supercells.

LINET allows studies of lightning occurrence in large geographical areas without the necessity to collect data from different countries and different detection networks. Thus, it becomes feasible to correlate lightning with all other data sources, which are available in large areas, including data from global networks, and to trace Mediterranean storms over very long paths.