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FLASH DENSITY REGIONAL MAPS OF SERBIA

For the seven years of using European lightning detection network LINET in Serbia, accurate flash density maps of this region were obtained together with other characteristics of lightning discharges such as current amplitudes, stroke rates over 24-hours period, strokes maps for lightning days, etc.

Flash density maps have advantages over isokeraunic maps and they are necessary in the design of lightning protection systems. This paper presents regional flash density maps of Serbia based on accumulated data for that period, using new developed software application based on geographical information system (GIS) technology for analysis of the results.

LINET STATIONS

Each LINET station (Fig.1) is connected to central computer in Munich and all data gathered in stations is automatically sent to it.

Field sensor consists of:

1. Two orthogonal crossed loops which are used to record changes in magnetic field
2. GPS antenna for precise measuring of event time
3. Local processor for data acquisition (it is placed near antenna)

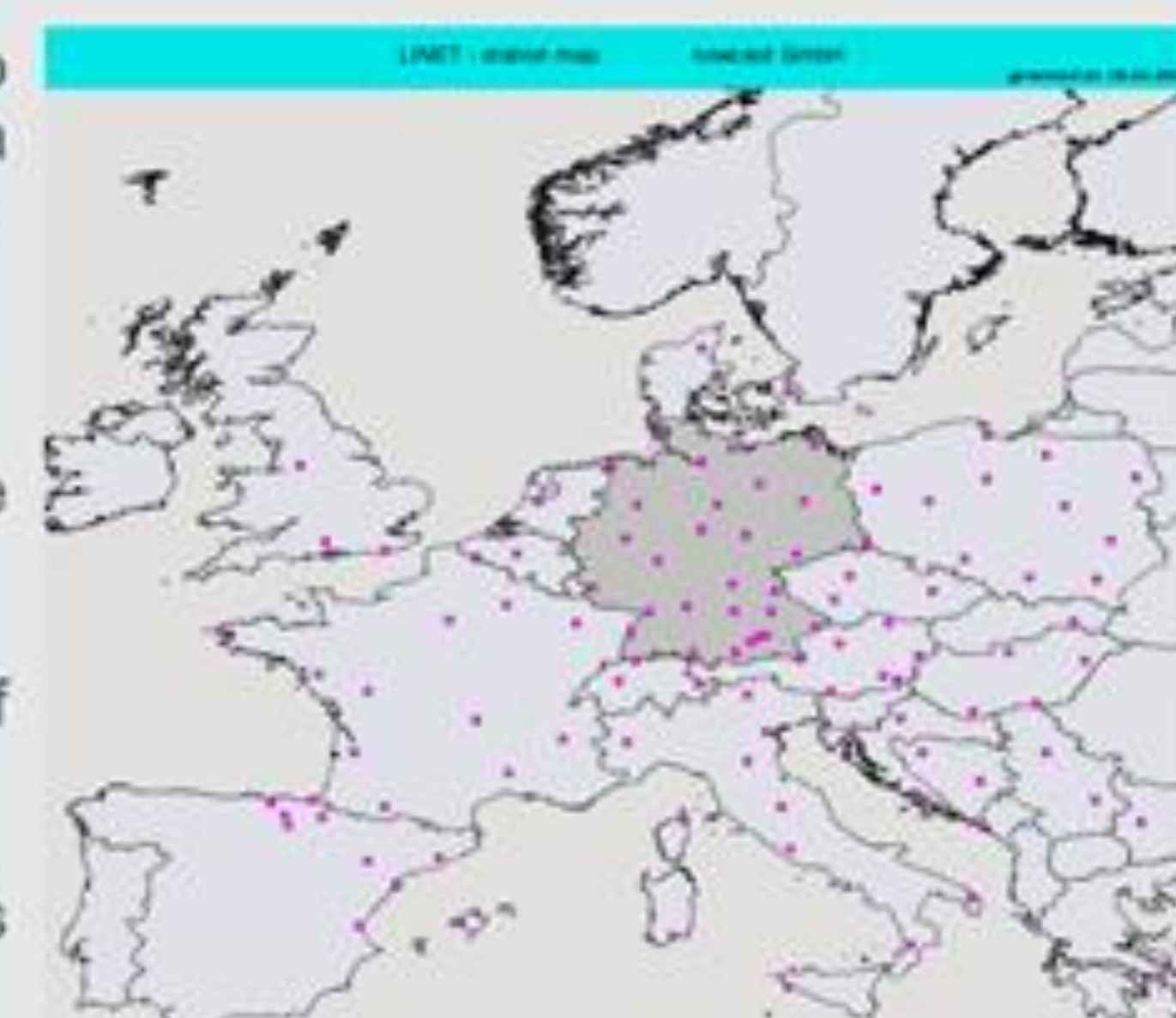


Fig.1 – LINET sensors distribution in Europe

LINET data and regional flash density maps



Isokeraunic maps were used to represent lightning activities with an average number of thunder days per square kilometer and per year.

Today, modern lightning detection are capable of registering flashes more efficiently and distinguishing them between discharge types, stroke currents amplitudes, precise discharge time determination etc.

Fig 2. shows average flash density that is obtained for Serbia.

Fig.2 – Flash density map of Serbia

LinetGIS Application

LinetGIS is newly developed application, specialized to create and display density map of Serbia (Fig.3).

The map is generated based on accumulated geospatial data gathered by LINET stations in Europe. All the data is stored in local database as well.



Fig.3 – LinetGIS main form

LinetGIS Modules



LinetGIS has several basic modules:

1. GIS module
2. Layer selection module
3. Objects search module (toolbar)
4. Search (query) results module
5. Generate reports module (example of report is shown in Fig. 4)

Fig.4 – LinetGIS report generating

Further plans:

1. Data analysis for other European countries.
2. Analysis of data for types of lightning strokes, current amplitudes and heights of thunder clouds.
3. Create module for showing flash density inside custom user defined rectangle/polygon.
4. Create module for geo queries based on flash density and other layers (rivers, lakes, nature, etc.).
5. Continue processing data using LinetGIS, in order to always have up-to-date lightning protection design.



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