

Visualization problems of the Hungarian Earthquake Catalog

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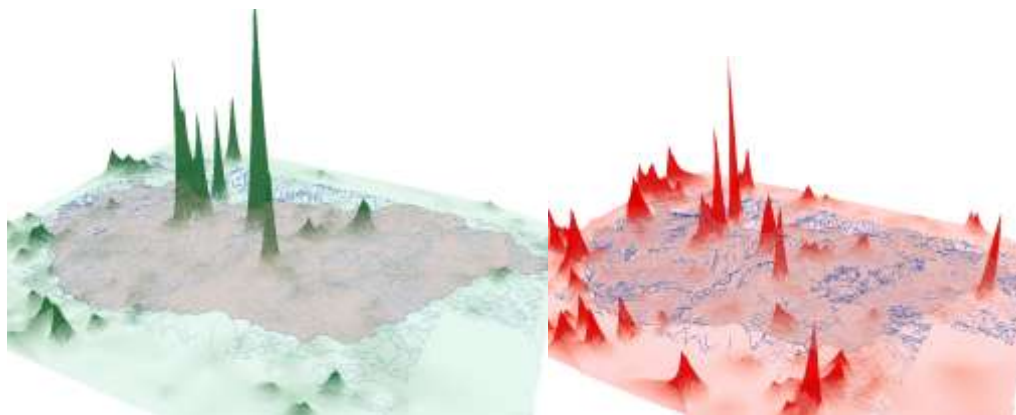


Fig. 1. The number of earthquakes and the evolving energy by the earthquakes between 1800 and 2006 in Hungary

Abstract— Earthquake catalogs are very important in representing the seismic activity in a region. The examination of data contained by a catalog evidently illustrate the seismologically active regions and provides a strong basis for studying the geological structure responsible for earthquakes and for developing seismotectonic models.

The catalog has important values for experts and common people as well. Consequently, there is a long tradition of representing earthquakes on maps. Recently the available dataset of the regional earthquakes of Hungary became so significantly large that the necessity of finding different visualization techniques has occurred.

In our study we give a brief overview of the difficulties in the cartographic representation of large data sets like earthquakes data catalog of Hungary and adjacent region. The Hungarian Earthquake Catalog contains about 25000 earthquakes dated from 456 A.D. till the present. Systematic earthquake data collection in the Pannonian region started in the nineteenth century. Officially organized collection and evaluation of earthquake data started in 1881. Visualizing the dataset of the Catalog on maps raised several problems. We are facing difficulties with visualization, because the dataset is large, the symbolization of all the data on one map is very complicated. Another problem is the data quality, as data gathered in different way in two hundred years ago and today. Nowadays scientists gather instrumental and macroseismic earthquake data and also deal with definition of earthquake focal parameters, too. Concerning the determination of exact location of the epicenters is also not uniform throughout the whole Catalog.

In our study we made an attempt to find the optimal visualization technique for representing the data of the Hungarian Earthquake Catalog. We made an effort to combine the traditional cartographic sign system and the possible visualization techniques offered by modern GIS softwares.

Traditionally the magnitude is one of the most important attribute in visualizing earthquakes, but we found that the evolving energy can be just as important as magnitudes are. Visualization has another significant role in representing the fluctuation of the seismologically active territories. Examining the possible generalization with a help of a Borland C++ Builder program we divide the represented territory with small grids and the program counts how many earthquakes are within one grid, and how much energy evolved during the earthquake. The aggregated data for unified cells can be easily drawn on the map and we also implement the possibility of using 3D visualization in representing the Catalog.

Index Terms— Visualization, GIS, Earthquake Catalog

[1] (URL for Transaction, journal, or magazine)