The magnetic field in Europe for the past 40 years

E. Thébault (1) and the MagNetE working group (2)

1. Institut de Physique du Globe de Paris, CNRS UMR 7154 (ethebault@ipgp.jussieu.fr)

2. Magnetic Network in Europe: International working group promoting the European repeat station and observatory network.

The magnetic field can be, in theory, represented or simply mapped at different spatial and temporal scales provided we have a sufficient amount of data equally distributed in space in time. Despite a geopolitical reorganization of the continent during the last 40 years, measuring the magnetic field at the Earth's surface has been a long standing and quasi-constant activity of the European scientific community. The MagNetE working group was officially born in 2003 after the first Repeat Station Network Workshop organized by the GeoForschungsZentrum (GFZ, Germany) at the Niemegk observatory. The MagNetE working group aims at coordinating nation efforts in order to produce more homogeneous, high quality and well in sync repeat station data over the European continent. In addition, a large effort is being made to provide some data quality information. Two consecutive workshops were held in 2005 and 2007, respectively in Warsaw, Poland, and in Bucharest, Romania, to ensure ongoing cooperation between the participants from some 20 European countries.

Thanks to this common effort, it is possible to use the repeat station data to study the main field, the secular variation and, to some extends, the lithospheric field at a continental scale over the European continent.

In this paper, we present the first magnetic field model over the European continent derived using a revision of Spherical Cap Harmonic Analysis technique adapted to deal with data available at one surface only. The model is obtained using exclusively repeat station and annual mean observatory data starting from 1965 to the most recent 2007 datasets when available. This model should help the MagNetE community to

investigate how well the protocol of measurements, the repeat data distribution and their error estimate comply with data modeling. Our aim in the near future is to provide the scientific community with software allowing the computation of the magnetic field anywhere in Europe for the past 40 years with unprecedented accuracy.