Geomagnetic paleointensity and paleoinclination between 1200 and 1700 AD derived from brick buildings in northern and south-eastern Poland.

Jerzy Nawrocki¹, Karol Standzikowski¹, Olga Rosowiecka², Krystian Wójcik², Tomasz Werner³, Maria Łanczont¹, Jan Gancarski⁴, and Marcin Wiewióra⁵

¹Maria Curie Skłodowska University, Faculty of Earth Sciences and Spatial Management, Lublin, Kraśnicka 2cd, 20-718, Poland (jerzy.nawrocki@poczta.umcs.lublin.pl)
²Polish Geological Institute - NRI, Departament of Mineral Resources, Poland (jerzy.nawrocki@pgi.gov.pl)
³Department of Magnetism, Institute of Geophysics, Polish Academy of Sciences, Księcia Janusza 64, 01-452 Warszawa, Poland.
⁴Subcarpathian Museum in Krosno, Piłsudskiego 16, 38-400 Krosno, Poland
⁵Institute of Archeology, faculty of History, Nicolaus Copernicus University in Toruń, Szosa Bydgoska 544/48, 87-100 Toruń, Poland

The bricks are one of the best material for archeomagnetic studies. They usually contain a very stable and intense remanent magnetization and their backing technique (i.e. horizontal location in the furnace) allow to determine the value of inclination of geomagnetic field. The technique were not changing since the middle ages up to the half of the XIX century, when a machine production have started. Preliminary archeomagnetic studies of the brick samples from Poland that providing a general information about paleoinclination changes in Gdańsk since 1080 AD indicated that this material is suitable for determination of ancient geomagnetic field parameters. However, in spite of the presence of many brick objects, as well as early and great tradition of brick building in Poland, this region of Europe is still “Tabula Rasa” on the map of current archeomagnetic investigations. The archeomagnetic curves for this part of Central Europe will be constructed almost from foundations. Well defined curves with secular variations of geomagnetic field during last 2500 year were constructed for example in neighboring Germany. The bricks for our archeomagnetic study were selected from churches, castles and palaces of well-known age. The age uncertainty in each case was less than 25 years. In order to check historical ages, a comparative TL dating of selected bricks was also conducted. The paleointensity of geomagnetic field was determined using the IZZI-Thellier-Thellier protocol. About 300 cylindrical specimens from the bricks located in more than 50 historical objects were examined. Studies of magnetic carriers and studies of anisotropy of magnetic susceptibility and anisotropy of isothermal remanent magnetization were also performed. The obtained paleosecular curves were compared with the coeval data from other regions of Europe.