

# Magnetic and electric properties of rocks derived from long-term recordings of geomagnetic field. Case studies

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The solar-cycle-related (SC) variation, present in the annual means of geomagnetic elements recorded at European geomagnetic observatories between 1952-1980, and the diurnal variation of the geomagnetic field recorded in a network of four magnetometric stations since May 2000 by the Institute of Seismology and Volcanology of the Hokkaido University are discussed in terms of magnetic and electromagnetic induction in the Earth. The magnetic and electromagnetic induction components of these variations of the geomagnetic field have been used to infer information on magnetic and electric properties of the underground. The lateral variation of magnetic and electric properties of the lithosphere has been mapped. They are discussed in terms of tectonic structure. The lateral variation of electric properties of the underground in Europe has been compared with known conductive structures derived from magnetotelluric and deep geomagnetic sounding studies and interpreted in terms of conductors at various depth levels in the crust and mantle.