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A preliminary risk assessment of geomagnetically induced currents over the Italian territory

Roberta Tozzi, Paola De Michelis, Igino Coco, and Fabio Giannattasio

Istituto Nazionale di Geofisica e Vulcanologia, Sezione Geomagnetismo, Aeronomia e Geofisica Ambientale, Roma, Italy (roberta.tozzi@ingv.it)

Geomagnetically Induced Currents (GICs), occurring as a result of space weather events, represent a hazard for the secure and safe operation of electrical power grids and oil/gas pipelines. The most exposed countries are those at high latitudes where, in the past, the occurrence of intense GICs has seriously damaged part of their power networks. However, very powerful space weather events have resulted in intense GICs also at middle and low latitudes.
The GIC index is a proxy of the geoelectric field and it can be estimated straightforwardly from magnetic observatory data. In this work, the GIC index is computed to investigate the possible impact of space weather events on the Italian territory. We calculate the GIC index using data from the two longest running Italian magnetic observatories, i.e. Castello Tesino and L'Aquila, and estimate the GIC index over more than 20 years of observations. A preliminary characterization of the general risk to which the Italian power grid network is exposed is given. Results show that, during periods of high magnetic activity, potentially detrimental GICs could flow through the power network, especially at the highest Italian latitudes that are characterized by a low conductivity lithosphere.