

## GEOMAGNETIC EXTREME STATISTICS FOR EUROPE

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Rapidly changing geomagnetic field variations constitute a natural hazard, for example to grounded power grids and pipeline networks. To understand this hazard we have continuous magnetic measurements across the world for typically less than 100 years. Much of the older data is also in analogue form, or is only available digitally as hourly or daily magnetic indices or mean levels. So it may not yet be clear what the true extremes in geomagnetic variation are, particularly on time scales - seconds to minutes - that are relevant for estimating the hazard to technological systems. We therefore use a number of decades of one minute samples of magnetic data from observatories in Europe, together with the technique of 'extreme value statistics', to explore estimated maxima in field variations in the horizontal strength and in the declination of the field. These maxima are expressed, for example, in terms of the variations that might be observed on time scales of 100 and 200 years. We also examine the extremes in the one-minute rate of change of these field components on similar time scales. The results should find application in both hazard assessment and in navigation applications.

Geomagnetism, hazard, extremes

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