

## Indirect measurement of Geomagnetically Induced Currents using magnetotelluric transfer functions

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### SUMMARY

The indirect measurement of the geomagnetic induced currents (GICs) in the electrical power lines is still a challenge. The usual method, named differential magnetometer method (DMM) method, compares the geomagnetic fields measured by two magnetometers, one under the line and the other close to it but unaffected by GICs. When there are no GICs, both magnetometers record the same. The objective is to measure these GICs with only one sensor and reduce the cost of the data acquisition. The method proposed takes advantage of the magnetotelluric (interstation) transfer functions (MTF). The data presented in this work correspond to the GICs caused by the G5-class geomagnetic storm of May 10, 2024 ( $K_p=9$ ), and measured under a 400 kV line that runs roughly along EW direction close to the La Pobla de Massaluca village (Spain). The DMM method gave a maximum GIC of 5A. Despite the agreement between the measurements of the GIC obtained by the DMM and MTF methods, this work is still in progress, and some aspects of the MTF method related to the signal amplitude and its frequency content need to be improved.

Keywords: Geomagnetic storm, Power lines, Differential magnetometer method

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