

## Induction Responses from Magnetotelluric Transfer Functions in the North Island, Aotearoa, New Zealand

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### SUMMARY

A regional-scale magnetotelluric (MT) survey of 53 sites collected in 2022-2023 has provided sufficient electric field coverage of the northernmost North Island of Aotearoa, New Zealand. These data were collected as part of a nationwide funded research programme called “Solar Tsunamis” and they broaden our understanding of geomagnetically induced currents (GIC) within a region where no measured MT data previously existed. Together with legacy MT data, MT transfer functions calculated across the entire North Island and are combined with local magnetic observatory data to compute GIC in transformers owned by the nation’s grid operator, Transpower New Zealand Ltd. MT-based results from recent storms whose intensity ranged across the G3-G5 NOAA Space Weather Scales are rendered as electric field maps and GIC storm simulation time series. Storm simulations from recent geomagnetic activity reveal the largest GIC occurring in the transformers located along a resistive band of basement rock in Northland.