

## **Inversion of Long Period Magnetotelluric Measurements in Northland and Southland, New Zealand**

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### **SUMMARY**

Long period magnetotelluric (MT) measurements have been acquired in the Northland and Southland regions of New Zealand within the framework of the “Solar Tsunamis” project to study geomagnetically induced currents. The surveys consist of 62 measurements in Southland and 53 measurements in Northland with an approximately 25 km site spacing.

Phase tensor maps in both areas show that data is good quality and can be used for 3-D inversion from 20 s to 10000 s. 3-D inverse modelling of the data has been carried out using the finite element code FEMTIC, incorporating topography and bathymetry.

First results in Southland show the thick and very resistive crust and upper mantle being most resistive in the Fiordland area. A deeper conductor is seen at 120 km depth shallowing to 80 km in the north-westernmost part of the survey below the area where seismic tomography detected the edge of the subducted Hikurangi plateau. In the shallow part of the model, the thick sediments of the Moonlight tectonic zone can be clearly seen in the model. The Dun Mountain Ophiolite belt is seen as a resistive feature.

In Northland, a conductor exists at 40 km depth in the northern part deepening to the south. This conductor is shallowest where the Northland basaltic fields and the Ngawha geothermal field is located.

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