

Magnetotelluric experiment across southern Barberton Greenstone Belt: a students' perspective of the field work

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ABSTRACT

The 3.2-3.5 Ga Baberton Greenstone Belt contains some of the planets oldest structural lineaments, shear zones and tectonic melanges that may represent surface features of sutures zones. A magnetotelluric survey was conducted in April 2009 across the NE structural grain of the greenstone belt to image at depth one of the most prominent sutures in this area, the Saddleback- Inyoka Fault Zone(SIFZ). This will provide a key set of observations with which to unravel Archean tectonics.

The MT field campaign took place over 6 weeks with a stringent timetable in effect throughout the campaign in order to complete the planned survey. Each team would typically check one MT station, pack one up and set a new station up in the next location every day. In the evenings the data was processed and its quality was scrutinised. The field campaign required a great deal of planning, negotiation and physical labour in order to make it a success!

To complement this geophysical data, ongoing field mapping by one of us, Scott MacLennan, is focussed on a transect across the SIFZ in the area around the Stolzberg syncline. In addition, and in order to increase the accuracy of the modelling of the magnetotelluric data, a representative rock sample set of the Baberton Greenstone Belt and beyond will be collected. Conductivity measurements will be carried out on these samples in Germany in 2010. This will complement the MT work to provide a more robust conductivity model for this area of the Kaapvaal craton. The integration of these different geological and geophysical techniques will result in a data set that could help elucidate what geodynamic processes were important in shaping this remnant of Archean crust.