



## **Seismic Structure of the Southern Part of Madagascar as Revealed by Waveform Modeling.**

Andriamiranto Raveloson (1), Raymond Durrheim (1), Elisa Rindraharisaona (2), and Frederik Tillman (2)

(1) University of the Witwatersrand, School of Geoscience, Johannesburg, South Africa, (2) Deutsches  
GeoForschungsZentrum (GFZ) Potsdam, Germany

Once located in the center of the Gondwana supercontinent, Madagascar comprises the crustal fragments from both the East and West Gondwana. The crust and uppermost mantle structure of the southern part of Madagascar, supposed to retain the imprint of multiphase tectonic deformations, was investigated using the waveform modeling technique. This method was applied to the seismograms recorded from the moderately large earthquake that occurred on 25th January 2013. Its epicenter is located offshore the southwestern coast of Madagascar near the town of Toliara. This earthquake was observed not only by the seismic stations installed in Madagascar, but by the regional seismic network as well. In this study seismograms recorded by the 25 temporary broadband seismic stations, installed along a direction nearly perpendicular to the Ranontsara shear zone during the SELASOMA experiment (2012 - 2014), were used. Synthetic seismograms are computed using the reflectivity method with a 4-layer crust over a mantle in half-space. The best fit between synthetic waveforms and observed seismograms is obtained by using a full-grid search approach. Results indicate the crustal thickness ranges from 27.5km to 39km and the presence of a sedimentary basin with low velocities in the west.

Key words: Waveform Modelling, Crustal Structure, Gondwana, Madagascar.