

## **A MAGNETOTELLURIC STUDY OF CONTINENTAL LITHOSPHERE IN THE FINAL STAGES OF BREAK-UP: AFAR, ETHIOPIA**

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As part of a major programme of research into the processes and controls involved in the break-up of continents and the generation of new oceanic crust, we have collected broadband magnetotelluric data along two ~50km long profiles in the Afar region of Ethiopia, with transient electromagnetic data for static shift control. The first is across a currently active magmatic segment that has experienced volcanic eruptions, seismic tremor and dyke injection over the last 3 years, and the other across a currently inactive segment. This presentation will concentrate on the results of the profile across the active segment. The data are broadly consistent with a two-dimensional interpretation, with geoelectrical strike along the segment's axis of rifting. Three-dimensional effects are seen primarily at sites beneath the rift axis and at longer periods. After static shift correction and rotation into TE and TM modes, we have inverted the data using the REBOCC algorithm. We find high conductivity at various depths beneath the segment axis: in a narrow zone close to the surface and in a much broader zone at depths straddling the crust-mantle interface. We interpret the deeper conductor to represent a magma chamber feeding the recent rifting episodes which has been inferred, but not previously observed directly, from a mis-match between the possible magma supply from deflation of the active volcanoes in the area and the volume of material intruded into the dykes.

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