



Upper crustal structure of the Otway Basin and its implications for continental breakup

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The evolution of the conjugate Australian – Antarctic margins has been loosely constrained by plate kinematic and widely spaced seismic reflection profiles. Gravity and magnetics data calibrated by seismic profiles and well data provide continuous coverage of the Otway margin, allowing us to evaluate current models of continental break up. We use merged onshore and offshore (satellite and shipboard) gravity data, and merged onshore aeromagnetic and offshore shipboard magnetic data provided by **Geoscience Australia** to clarify the upper crustal structure of the Otway Basin (SE Australian margin). The objectives of the present research are: 1) to display basement-involved extensional faults and magmatic centers; 2) to map the variations in crustal thickness; 3) to evaluate a 3D model of along-axis segmentation. These results integrated with data from adjacent sectors (Ball, 2004) are used to construct a model of SE Australian margin evolution.

Spectral techniques and Euler 3-D deconvolution are applied to the gravity and magnetic data to delineate basement and igneous structures. Following calibration of the potential field with seismic reflection and refraction data, mapping was extended outside of the zone of seismic coverage. This provides a synoptic 3D view of syn-rift and breakup structures in the Otway basin. Forward modeling and inversion techniques for gravity data are also used to determine the shape and geometry of the rift basins.

Initial results of this research show a narrow zone of transitional crust underlies the Otway basin, in contrast to central sectors. We investigate models of oblique-slip openings associated with the asymmetric geometry of the developing rift between Australia and Antarctica.