Geophysical Research Abstracts
Vol. 15, EGU2013-2194, 2013
EGU General Assembly 2013
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Oroclinal bending in eastern Australia and the transition from eastern Tethys to Panthalassa

Gideon Rosenbaum
The University of Queensland, School of Earth Sciences, Brisbane, Australia (g.rosenbaum@uq.edu.au, 61 7 3365 1277)

During the whole of the Paleozoic, the Australian continent has occupied a tectonic position between the Tethys Ocean in its northern boundary and the Circum-Pacific (Panthalassan) subduction zones in the east. The latter has been subjected to alternating episodes of trench advance and trench retreat, as expressed, in the Australian Tasmanides, by changes from accretionary processes to rifting and S-type magmatism.

Geological observations from the easternmost and youngest component of the Tasmanides, the New England Orogen, show that this orogenic belt forms a strongly contorted ear-shaped structure, delineated by a number of early Paleozoic to early Permian tectonic elements. Bending and fragmentation of the continental margin commenced in the early Permian, at ~300 Ma, and was associated with the development of extensional sedimentary basins, large vertical-axis block rotations and oroclinal bending.

The geodynamic environment that controlled this behavior was likely associated with an asymmetric trench retreat in the transition zone between the Tethyan domain and the Panthalassan subduction zone. It appears, therefore, that during the early Permian, simultaneous oroclinal bending took place in the tip of the wedge-shaped Tethyan domain (Variscan Oroclines) and in its outer margin (New England Oroclines).