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## Orogen-perpendicular structures in the central Tasmanides and implications for the Paleozoic tectonic evolution of eastern Australia

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### ABSTRACT

The curvilinear ~E-W structures of the southern Thomson Orogen are approximately orthogonal to the general ~N-S structural trend of the Tasmanides of eastern Australia. The origin of these orogen-perpendicular structures and their implications to tectonic reconstructions of eastern Gondwana are not fully understood. Here we use geophysical data to unravel the geometry, kinematics and possible timing of major structures along the boundary between the Thomson Orogen and the southern Tasmanides (Delamerian and Lachlan orogens). Aeromagnetic data from the southern Thomson Orogen show WNW, E-W and/or ENE trending structural grains, corresponding to relatively long wavelength linear geophysical anomalies. Kinematic analyses indicate strike-slip and transpressional deformation along these geophysically defined faults. Structural relationships indicate that faulting took place during the Benambran (Late Ordovician to Middle Silurian) and Tabberabberan (late Early to Middle Devonian) orogenies. However, some of the described crustal-scale structures may have developed in the Cambrian during the Delamerian Orogeny. Interpretation of deep seismic data shows that the crust of the southern Thomson Orogen is substantially thicker than the Lachlan Orogen crust, which is separated from the Thomson Orogen by the north dipping Olepoloko Fault. A major lithospheric-scale change across this boundary is also indicated by a contrast in seismic velocities. Together with evidence for the occurrence of Delamerian deformation in both the Koonenberry Belt and northeastern Thomson Orogen, and a significant contrast in the width of the northern Tasmanides versus the southern Tasmanides, it appears that the southern Thomson Orogen may represent the locus of orogen-perpendicular segmentation, which may have occurred in response to along-strike plate boundary variations.

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