



## **Deciphering the Tectonic History of the Northern Transantarctic Mountains**

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The Transantarctic Mountains (TAMs) are the largest non-compressional mountain range in the world, and their structure plays a key role in the climatic and tectonic development of Antarctica. While numerous uplift mechanisms for the TAMs have been proposed, there is little consensus on their origin. Over the past three years, we have operated a network of 15 broadband seismic stations within a previously unexplored portion of the northern TAMs. Using data collected by this array, we have undertaken numerous studies to further assess the crustal and lithospheric structure beneath the mountain range and to differentiate between competing origin models. Receiver functions indicate crustal thickening inland from the Ross Sea coast but comparable crustal thickness beneath the TAMs and the East Antarctic plateau, indicating little evidence for a substantial crustal root beneath the mountain range. Body and surface wave analyses show a pronounced low-velocity anomaly beneath Terror Rift, adjacent to the TAMs, and extending beneath Victoria Land in the upper mantle. Together, these findings support a thermally-buoyant source of uplift for the northern TAMs and broad flexure of the East Antarctic lithosphere.