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EXTENSION IN THE WESTERN ROSS SEA REGION - LINKS BETWEEN ADARE BASIN AND VICTORIA LAND BASIN

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Marine magnetic data off north-western Ross Sea and estimates of extension for the Victoria Land Basin in south-western Ross Sea have been used to constrain an extensional model for the region for the past 48 Ma. Continuous extension has occurred in the oceanic Adare Basin north of the Ross Sea for the period of 45 - 25 Ma with episodic extension from at least 34 Ma to possibly the present for the Victoria Land Basin in continental region to the south. The Victoria Land Basin and the Northern Basin are rift basins that trend north-south along the western margin of the Ross Sea, and are probably of the same age. An east-west offset separates them. The Northern Basin is contiguous with the Adare Basin. Spatial and temporal relationships suggest these extensional features may have the same cause with the difference in time of onset inferred to be caused by differences in the strength of the lithosphere in the two regions and their thermal state. The offset in the locus of extension between the Victoria Land Basin and the Northern Basin at about 74°S results in a transtensional stress regime that coincides closely with the existence of a major igneous crustal intrusion of inferred similar age associated with the Polar Three magnetic anomaly. The southern limit of the extension, south of Ross Island, is poorly constrained, but may be accommodated by distributed deformation that is reflected in the magnetic anomalies detected over the northern margin of the Ross Ice Shelf. The observed amount of spreading at the southern end of the oceanic Adare Basin based on magnetic anomaly identification is about twice the extension of the adjacent contiguous Northern Basin inferred from crustal thinning. Continuity of continental crust and a strong linear magnetic anomaly along west and east sides respectively of the junction of the two regions indicates there is no distributed extension away from the Northern Basin.