



Fault Architecture Within the Eastern Terror Rift, Western Ross Sea, Antarctica

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The Terror Rift is a zone of intraplate deformation within the Antarctica plate. Association with Late Cenozoic volcanic rocks and fault scarps on the seafloor indicates neotectonic to recent activity. Intraplate extension and transtension associated with regional strike-slip deformation have both been proposed for the Terror Rift by previous workers. Marine seismic data across the Terror Rift, western Ross Sea, Antarctica, is revealing new details of neotectonic rift geometry. An area of 30km by 90km near the Drygalski Ice Tongue where the spacing of E-W lines is at a minimum was selected for detailed study. There are three structural components in the study area: a central arch structure flanked by two opposing dip domains bounded by border fault systems. The central arch shows two phases of fault activity. An early localized faulting episode produced a symmetric graben truncated by an erosional unconformity. Later, some pre-existing faults were reactivated, cutting through the angular unconformity and reaching up to, and in places displacing, the seafloor. The second faulting phase formed a larger symmetric graben, c. 14 km across. Maximum stratal displacement across the graben boundary faults are 0.30ms on the east, and 0.45ms on the west. The two bounding border fault regions, one 15km to the west and the other 10km to the east of the main arch, define a composite graben feature surrounding the main arch. The border fault systems are symmetric in the north, with equal fault dips and offset magnitude. Moving southward, the western border fault system has increasing offset magnitude producing a west-tilted half-graben. Minimum fault displacement across the two border fault systems is an average of .10ms in the east and .40ms in the west. These structures will be traced along strike to map the 3D fault architecture of the Terror Rift on a regional scale. Results to date, however, document only normal

faulting in this sector of the Terror Rift, suggesting extension dominates the intraplate deformation field.