



Active fracture zones? Cenozoic strike-slip faulting in West Antarctica points to long-lived intraplate deformation along oceanic and continental fracture zones

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An outstanding feature of the Antarctica-Australia plate boundary east of 139°E is the abundance of extraordinarily well-developed fracture zones that segment the mid oceanic ridge in the Southern Ocean. This sector of Antarctica is commonly regarded as a classical passive margin i.e. a tectonically quiet region of sediment accumulation during plate divergence. However, the architecture, kinematics, and timing of intraplate deformations at the northeastern edge of Antarctica cannot be reconciled into a typical passive margin environment, as well as into other reference geodynamic frameworks of Plate Tectonics. Several lines of evidence, in fact, indicate that fracture zones east of 139°E have been tectonically active all along their length during the Cenozoic and their activity still persists in modern times. Here we combine geological and geophysical data in northeastern Antarctica to show that they support the post-rift southeastward extrusion of the passive margin east of 139°E along impressively long right-lateral strike-slip deformation belts. These include transform faults and their collinear oceanic fracture zones and continental shear zones. A striking outcome is the intraplate accommodation of transform faulting in this region of the Earth.