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Meso-Cenozoic reactivation of the Rennick Geodynamic Belt from the integration of field structural data and lineament domains

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The Rennick Geodynamic Belt (RGB) is a major feature of the crustal architecture of the East Antarctica. It is a regionally-sized tectonic boundary separating the tectonic units of the Northern Victoria Land (NVL) and the East Antarctic craton. It is characterized by an elongated belt (> 100 km) that includes the deformation zone of regional fault strands, such as the Rennick Fault. Previous studies revealed that this deformation corridor was characterized by poly-phased tectonic movements since Cambro-Ordovician times. The brittle deformation architecture associated to these fault zones, the sharp-asymmetric subglacial morphology, and the geophysical signature at the Rennick Glacier, as well as the geodetic investigations in NVL, strongly suggest that the region is involved by Cenozoic tectonic activity.
In this work we explore the reactivation of the RGB by a multiscalar approach. The lineament domain analysis from synthetic scaled images (DEM and satellite data) of the landscape (including both the ice sheet surface and the outcropping mountains) is performed with original automatic procedures and allows to identify the most recent tectonic pathway and the associated crustal stress field. The fault and fracture inversion by an original multiple Montecarlo method allows to identify the stress field(s) responsible for the measured brittle deformation associated to the main fault strands.
The integration of the two approaches allows to highlight the poly-phased kinematic history and relative ages of the RGB and to better understand the geodynamic setting of the boundary between the EAC and the NVL.