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RECENT TECTONICS AND RELIEF EVOLUTION IN SOUTH-WESTERN SCOTIA ARC, ANTARCTICA

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This work presents a compilation of new data on lineaments and fault measurements through the South Shetland Block, a continental fragment of the southern branch of the Scotia Arc. Faults, joints and lineaments have been measured and analysed by different methods in order to study the complex overprinting of brittle deformations.

In relation to fractures, we have analysed brittle mesoscopic structures grouped in several measurement stations in different islands of the South Shetland archipelago. Mesofaults were analysed with the Right Dihedra, Etchecopar and Search Grid and Stress Inversion paleostress determination methods. The obtained results have been integrated with previous data from Livingston, Deception, King George and Elephant Islands.

The analysis of these structures show a recent stress field characterized by an extensional regime, with local compressional stress states. The maximum horizontal stress shows NW-SE and NE-SW orientations and the horizontal extension in N-S and NW-SE directions. Alignments of joints show a maximum of NNE-SSW to NNW-SSW orientation. Lineaments obtained from aerial photographs and satellite images show several relative maxima N-S, NE-SW, E-W and NW-SE strikes.

These stress fields and joints and lineament patterns are related to the Bransfield Basin opening, the Scotia-Antarctic sinistral transcurrence and the subduction of the oceanic lithosphere in the South Shetland Trench modified in the vicinity of the Hero and Shackleton Fracture Zones.

The relief features in this region are mainly associated to the interaction of recent tectonic activity, glacio-isostasy, ice erosion and marine action connected with changes in the sea level. The studied brittle structures favour the development of depressions, drainage networks, straight scarps and cliffs that are essential components of the landscape. These geological field data, integrated with marine geophysical data and studies on relief evolution allow a better understanding of the recent geodynamic evolution of the South-Western Scotia Arc.