



## Mapping the intensity of brittle deformation through ice covered regions: a study from Antarctica (North Victoria Land)

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North Victoria Land (NVL), Antarctica is one of the most remote and inaccessible outposts of our planet where few outcrops are available for direct geological investigation. The long-lasting tectonic evolution of this region results in a complex architecture characterized by the presence of regionally sized, crustal scale faults whose structural characteristics (e.g. geometry, thickness, location of transfer zones and off-shore prosecution) are still debated.

In this work we present a map of the intensity of brittle deformation measured in 113 field outcrops along the Rennick-Aviator km-scale fault corridor, and quantified through the non-dimensional and scale invariant H/S parameter (H = fracture dimension and S = spacing among fractures belonging to the same azimuthal family; see Cianfarra et al. 2022). The sparse fracture measurements were then interpolated with Surfer® (Golden Software, LLC) v. 23.2.17 to analyse the spatial variability of deformation with the aim of clarifying the tectonic link between the Rennick and Aviator faults.

The thematic map is prepared by a polymodal regression by full cubic surface that was applied to the field measurements (between 70.5°-71 °S and 160-165.5°E) collected during scientific expeditions funded and logistically supported by the Italian National Antarctic Program (e.g.; PNRA16-00056\_G-IDEA and PNRA18-00338\_LARK projects). Measurements were normalized by a weighting factor to take into account the brittle strength variability of the analysed lithotypes (e.g., basalts-dolerites, well cemented sandstone-conglomerates, granites-migmatites, gneiss)

The comparison of our georeferenced thematic map with existing maps of satellite-derived potential fields, bed subglacial topography and off-shore bathymetry, and Antarctic geology which are available as free dataset in the web (e.g. ADMAP, BEDMAP, Quantarctica, GeoMAP dataset, among the others) allows to supply constraints for modelling ice covered tectonic structures, to better highlight the active role of the main tectonic lineaments of NVL, as well as to clarify the relationship, connection and link between onshore and offshore tectonic structures (this last topic is being investigated in the frame of the ongoing PNRA19-00051\_BOOST project).

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