Geophysical Research Abstracts
Vol. 21, EGU2019-10748, 2019
EGU General Assembly 2019

The on-land prosecution of the Tasman Fracture Zone: the structural architecture along the deformation zone of the Rennick Geodynamic Belt (North Victoria Land, Antarctica)

Paola Cianfarra (1), Costanza Rossi (1), Giovanni Capponi (2), Laura Crispini (2), Laura Federico (2), and Francesco Salvini (1)

(1) Dipartimento di Scienze, Università degli Studi Roma Tre, Roma, Italia (paola.cianfarra@uniroma3.it), (2) DIPTERIS, Università degli Studi di Genova, Genova, Italia

The Rennick Geodynamic Belt (RGB) is a regionally sized (length > 100 km) deformation corridor separating the geotectonic provinces of East Antarctica, to the W and North Victoria Land, to the E. This corridor is characterized by the envelope of the deformation zones of a fault network, nearly N-S oriented, lying on the southward, on-land prosecution of the Tasman Fracture Zone (TFZ).
The oceanic-to-continental connection between transforms and intraplate strike-slip faults is poorly known. In this contribution we explore the link between the RGB and the TFZ by a multi-scalar approach that includes the evidences of remote sensing tectonic deformations (i.e. lineament domains) and field structural data (i.e. intensity of brittle deformation).
During the 2018-2019 austral summer a geological field campaign was performed in the framework of the G-IDEA project (Geo-Ice Dynamics of East Antarctica) of PNRA (Programma Nazionale di Ricerche in Antartide, Italian National Antarctic Research Program). The campaign was dedicated to the collection of field structural data along transects nearly orthogonal to the RGB both in its western (Usarp Mts) and eastern (Bowers Mts) sides. Specifically, the intensity of brittle deformation related to the tectonic stresses was quantified by the a-dimensional, scale-invariant, H/S parameter. This is the ratio between the fracture dimension (H) and its spacing (S) with the adjacent fracture belonging to the same azimuthal family. In this way it is possible to analyze the spatial variation of the intensity of brittle deformation at various distances from the main shear zone.
Preliminary results from the analysis of the collected data confirm the main strike-slip behavior of the fault network associated to the RGB and suggest that its eastern sector (Bowers Mts province) is characterized by a higher intensity of brittle deformation (mean H/S > 5) with respect to the western sector (Usarp Mts province, mean H/S < 2). Moreover, the northern parts of both the Bowers and Usarp provinces show the highest intensity of brittle deformation (H/S value of 7.9 in the northern Bowers province and 4.8 in the northern Usarp province). This feature may be related to the southward, onland prosecution of the TFZ.
Results from field campaign are in line with the remote sensing deformation evidences. Two main lineament domains characterize the western and the eastern side of the RGB. A main N-S to NNE-SSW trending lineament domain develops to the W, toward the Wilkes Basin. On the other hand, a NW-SE main lineament domain spans the entire North Victoria Land, to the E of RGB.
Results from this multi-scalar approach confirm the existence of two geotectonic provinces, namely the Bowers and Usarp provinces, separated by the RGB and characterized by different intensity of brittle deformation and different lineament domains. The analysis of the spatial distribution of the intensity of brittle deformation also suggests that the RGB represents the on-land, southward prosecution of the TFZ.