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Constraints on the dynamics of melt migration, flow and emplacement across the continental crust

Carolina Cavalcante (1) and Gustavo Viegas (2)

(1) Géosciences Montpellier, Université Montpellier 2, France, (2) School of Geography, Earth and Environmental Sciences, Plymouth University, UK, (3) Instituto de Geociencias, USP, Brazil

The presence of partial melting during deformation produces a drastic change in the rheological behavior of the continental crust. The rock strength decreases with melt fractions as low as $\sim$0.7 %. At pressure/temperature conditions typical of the middle crust, melt-bearing systems may play a critical role in the processes of strain localization and in the overall strength of the continental lithosphere. In eastern Brazil, Neoproterozoic tectonics are often associated with wide partial melting and shear zone development, that promote the exhumation of mid- to lower crustal layers where compositionally heterogeneous anatexites with variable melt fractions and leucosome structures are exposed. The leucosomes usually form interconnected networks of magma that reflect the high melt content present during deformation. In this contribution we address two case studies encompassing the dynamics of melt flow at magma chambers, represented by the Carlos Chagas anatexite, and the mechanisms of melt migration and channeling through shear zones, in which the Patos shear zone serves as an analogue. Through detailed petrostructural studies of anatexites exposed at these settings, we aim to demonstrate the way melt deforms and localizes strain, the different patterns of melt flow pathways across the crust, and the implications for the mechanical behaviour of the Earth's lithosphere during orogenic deformation.