Geophysical Research Abstracts
Vol. 20, EGU2018-13353, 2018
EGU General Assembly 2018

Breakup of an old oceanic lithosphere: structures along the Antarctic margin of the Australo-Antarctic basin

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The structural pattern of lithospheric breakup varies strongly from one margin to another. The main controlling parameters are the amount of magma available and the rheology of the broken lithosphere. In the Australo-Antarctic basin, the emplacement of the new steady-state oceanic ridge takes place in magma-poor rifted margin where large domains of exhumed mantle are exposed at the seafloor. Moreover the ridge propagation toward the West implies the breakup of different type of continental lithosphere as well as the breakup of old and strong oceanic lithosphere.

As a result, the different rheological behaviours lead to different structural patterns during mantle exhumation and during the ridge emplacement. We compare several seismic profiles running through the breakup zone, between the exhumation point and the first oceanic crust, along the Antarctic margin. The first observations lead us to consider different deformation processes and deformation/magmatism interactions depending on the initial rheology of the lithosphere.