Geophysical Research Abstracts,
Vol. 11, EGU2009-12736, 2009
EGU General Assembly 2009

A thermo-rheological study of the Iberia/Newfoundland conjugate passive margins: determination of the orogenic geometry during an eventual collision

P. Ozfirat (1,2), G. Manatschal (2), and K. Schulmann (2)

(1) Institute for Mineralogy and Petrology, ETH Zurich, Switzerland (pinar.ozfirat@erdw.ethz.ch), (2) CGS, ULP Strasbourg, France

According to the Wilson Cycle every rifting event that induces ocean formation will be followed by oceanic suturing and will eventually be terminated by continental collision. The Atlantic Ocean should, in fact, also follow such an evolution. The study of thermo-rheological profiles from the Iberia/Newfoundland conjugate passive margins, located in the North Atlantic Ocean, emphasizes the rheological evolution of each margin, according to the thermal relaxation age. Analysis of these profiles shows that the middle crust of the Newfoundland margin represents the weakest layer of the entire system of conjugate margins, whatever the considered thermal relaxation time. The entire Iberian margin has a relatively high strength. Fault reactivation leads to well-distributed deformation through the entire conjugate margin system before initiating subduction within the strongest fault. Throughout the compression, asymmetry of the passive margins both persists during the reactivation process, and also controls that reactivation. Furthermore, the existence of the Block H plays an important part in the distribution of deformation at the beginning of the convergence. Owing to a major strength difference between the upper and the middle crust of the Newfoundland margin, a decoupling of these crusts seems to be plausible during an eventual collision. Finally, depending on the thermal state when a collision arises, two orogenic geometries are possible. The geometry induced by a collision after 15my of thermal relaxation would approach a ‘Pyrenean-type’. However, if the collision occurs later on (after 112my of thermal relaxation) the orogenic geometry would resemble an ‘Alpine-type’.