Geophysical Research Abstracts
Vol. 12, EGU2010-3940, 2010
EGU General Assembly 2010

Evidence for poly-phase rift-sequences and rift-migration at the Iberia rifted margin

Emilie Sutra (1), Gwenn Péron-Pinvidic (2), Gianreto Manatschal (1), and Patrick Unternehr (3)

(1) IPGS - EOST - UdS - CNRS, Strasbourg, France (emilie.sutra@eost.u-strasbg.fr) (manatschal@illite.u-strasbg.fr), (2) Geological Survey of Norway, Trondheim, Norway (Gwenn.Peron-Pinvidic@ngu.no), (3) TOTAL Exploration Production/Projets Nouveaux, Paris la Défense, France (patrick.unternehr@total.com)

In the last 20 years the knowledge of deep-water rifted margins has considerably evolved. Until the 90s, the architecture of rifted margins was represented mainly by either pure or simple shear mono-phase models. These models juxtaposed continental and oceanic crusts along a sharp Ocean Continent Boundary (OCB). The discovery of exhumed subcontinental mantle and hyper-extended continental crust shows that simple models do not work and are unable to explain the complex spatial and temporal evolution observed at rifted margins. A number of new poly-phase tectonic models have emerged to explain how lithospheric extension is accommodated in space and time. One of these models proposes that continental rifting starts with pure shear and ends with simple shear also referred to as stretching and exhumation phases. The most interesting and important part of this new model is the stage between the pure and simple shear phases, which is referred to as the "thinning phase". The thinning phase is characterized by conjugate crustal scale detachment systems that are decoupled within the middle crust and results in the individualization of a crust block, which is also known as the "H-block". However, mechanics, timing as well the tectono-sedimentary evolution and stratigraphic record related to the thinning phase are still poorly understood. To better constrain the thinning phase, we focused on the Iberia rifted margin. Thanks to the most complete data set available from a deep-water magma-poor rifted margin worldwide, we can identify and map the sedimentary sequences corresponding to the different rift phases along these margins. Our study of seismic reflexion profiles across the Iberia margin shows that sedimentary units presenting syn-tectonic geometries further inboard, become further outboard pre-tectonic. Even more surprising is that sedimentary units can be pre-tectonic in East-West oriented sections and syn-tectonic in North-South oriented sections. By mapping seismic units across the Iberia margin we can demonstrate the poly-phase nature of rifting and illustrate the migration of the tectonic activity from Galicia Bank towards the Iberia Abyssal Plain. Based on correlations with ODP drill sites in the Iberia margin, we can date the sedimentary unit that records the migration of the rifting from the proximal into the distal margin as Tithonian. Based on the synthesis of ODP drill holes, the Tithonian sediments were deposited at shallow marine conditions, between 50 and 200 metres in the northern part of the margin and between 200 and 800 metres in the south. Future work will try to better constrain how subsidence and migration of the Tithonian are related to crustal thinning and the formation of the H-Block which is mapped on the conjugate Newfoundland rifted margin.