Geophysical Research Abstracts
Vol. 18, EGU2016-4920, 2016
EGU General Assembly 2016

Stratigraphic signature of lithospheric deformation style in post-rift passive margin basins

Delphine Rouby (1), Ritske Huismans (2), Cecile Robin (3), Jean Braun (4), and Didier Granjeon (5)

(1) GET UMR CNRS 5563, Toulouse, France (Delphine.Rouby@get.omp.eu), (2) Department of Earth Science, University of Bergen, Norway, (3) Geosciences Rennes, Université de Rennes 1, Rennes, France, (4) ISTerre, Université Grenoble Alpes, Grenoble, France, (5) IFPEN, Rueil Malmaison, France

We revise commonly accepted models explaining long-term stratigraphic trends along Atlantic-type passive margins by including the impact of complex lithosphere deformation at depth and it's coupling with surface processes. To achieve this, we simulated the evolution of a passive margin basin using a cascade of three modeling tools: a thermo-mechanical model of the syn-rift stretching of the lithosphere, a flexural and thermal model of the post-rift stage that includes coupling with surface processes and, finally, a stratigraphic model of the associated sedimentary basin architecture. We compare two necking styles that lead to different margin geometries: wide and narrow margins that form by heterogeneous stretching. Wide margins, forming thinner and wider sedimentary wedges, show significantly larger aggradation component and longer preservation duration, in more continental/proximal depositional facies. Narrow margins are characterized by enhanced erosion and by-pass during transgression. Through a parametric analysis we constrain the relative contribution of lithosphere deformation and surface processes on the stratigraphic trends and show that both may contribute equally to the stratigraphic architecture. For example, enhanced erosion in narrow margins impacts the volume of sediments delivered to the basin, which, in turn, significantly increases the subsidence. Our simulations also underline the importance of the assumed sediment transport length, which controls whether the main depocentres remain in the necking zone or reach the more distal parts of the margin.