

Stratigraphy of two conjugate margins (Gulf of Lion and West Sardinia): modeling of vertical movements and sediment budgets

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The post-rift (~20-0 Ma) vertical movements of the Provence Basin (West Mediterranean) are quantified on its both conjugate (the Gulf of Lion and the West Sardinia) margins. This work is based on the stratigraphic study of sedimentary markers using a large 3D grid of seismic data, correlations with existing drillings and refraction data. The post-rift subsidence is measured by the direct use of sedimentary geometries analysed in 3D [Gorini et al., 2015; Rabineau et al., 2014] and validated by numerical stratigraphic modelling. Three domains were found: on the platform (1) and slope (2), the subsidence takes the form of a seaward tilting with different amplitudes, whereas the deep basin (3) subsides purely vertically [Leroux et al., 2015a]. These domains correspond to the deeper crustal domains respectively highlighted by wide angle seismic data. The continental crust (1) and the thinned continental crust (2) are tilted, whereas the intermediate crust, identified as lower continental exhumed crust [Moulin et al., 2015, Afilhado et al., 2015] (3) sagged. The post-break-up subsidence re-uses the initial hinge lines of the rifting phase. This striking correlation between surface geologic processes and deep earth dynamic processes emphasizes that the sedimentary record and sedimentary markers is a window into deep geodynamic processes and dynamic topography.

Pliocene-Pleistocene seismic markers enabled high resolution quantification of sediment budgets over the past 6 Myr [Leroux et al., in press]. Sediment budget history is here completed on the Miocene interval. Thus, the controlling factors (climate, tectonics and eustasy) are discussed.

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