Geophysical Research Abstracts
Vol. 16, EGU2014-5281, 2014
EGU General Assembly 2014

Different subsidence components at passive margins

Mauro Cacace and Magdalena Scheck-Wenderoth
Helmholtz Centre Potsdam GFZ German Research Centre for Geosciences, Potsdam, Germany (cacace@gfz-potsdam.de)

Passive continental margins form by thermal contraction following rifting and continental break-up. As such, these systems are characterized by a two-stage subsidence history driven in the first stage by tectonic (syn-rift subsidence) and in a second phase by thermal re-adjustment (post-rift subsidence). It has been now recognized that passive continental margins represent complex dynamic systems which are affected by thermal-induced subsidence, time-dependent flexure of the lithosphere, tectonic stresses and eustatic sea level changes. The aim of this contribution is to analyse quantitatively the post-rift evolution of a passive margin by means of 3D numerical modelling taking into account the dynamic coupling between sedimentation, lithospheric flexure and thermal contraction on the distribution, both in time and space, of the margin subsidence. To achieve this, existing 3D lithosphere-scale structural models are used to constrain the present-day rheology and internal structure, including details of the preserved sedimentary succession as well as of the deeper crustal and lithospheric-mantle. Backward in time, i.e. backstripping of these 3D structural models are also used to reconstruct the margin history at the time of break-up thus providing observation-based initial conditions for the forward subsidence modelling. The final goal of the study is twofold. On the one hand we aim at determining how the rifting processes producing a 3D spatially variable stretching of the lithosphere, including syn-rift sediment deposition, might impact the post-rift evolution of the margin and the associated accumulation space for the sedimentary systems. On the other hand, the impact of the flexural behaviour of the lithosphere in response to both the post-rift thermal evolution (i.e. lithosphere cooling) and sedimentation history (i.e. gradual loading) is investigated in order to better understand the effects of these geodynamic features on the post-break up vertical movement.