

## **Uplift of sedimentary basins in an extensional setting as a result of the migration of a thermal anomaly**

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The formation of sedimentary basins in a purely extensional setting is traditionally related to active tectonic processes during the syn-rift phase and passive processes such as thermal subsidence during the post-rift phase. In a purely extensional setting there is no room for uplift events. However, on seismic data unconformities are observed and interpreted as such, but they cannot be placed in a fully extensional setting.

A seismic data base of the South Atlantic conjugate margins consisting only of already published seismic lines has given us the natural laboratory. Here, sedimentary basins show unconformities in their post-rift phase. Traditionally, the South Atlantic conjugate margins are thought to have undergone a considerably easy evolution, but recent interest and subsequent investigations in the region have proved this wrong.

We investigate the possibility of a mechanism that couples mantle-dynamics with surface processes. The aim is to explain the unconformities observed on seismic data in marginal basins that have formed under an extensional stress regime. We propose that a laterally migrating thermal anomaly could result in the temporary uplift of marginal basins during their post-rift phase, thereby creating an unconformity. With the use of a 2D numerical, thermo-mechanical code, we tested several parameters that could be of influence on the evolution of the topography. Thirty-six tests have been performed, varying the initial geometry, extensional velocity and the initial location of the thermal anomaly.

Our models show that all three parameters influence the formation of marginal basins and their vertical movements to different extends. The initial geometry of the lithosphere appears to control the direction in which the thermal anomaly is migrating. Even when the anomaly is 100's of kilometers away from the break-up point, it migrates towards the region where break-up eventually occurs. Local, temporary, vertical movement of marginal basins is observed in the order of 100's of meters.