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Early Rift Structures: A Comparison Between The Gulf Of Suez And The Gulf Of Corinth

Extension may start for various raisons (thinning of the lithosphere by mantellic convection, far field stress, slab retreat) and affect various crust types. The initial crust is some time rather homogeneous, as in the Gulf of Suez or highly heterogeneous, as in the Gulf of Corinth. In the Gulf of Corinth, thrusts may be reactivated as decollement level whereas in the Gulf of Suez, except some thin and rather superficial shally beds, the unique major decollement level is the brittle/ductile transition in the crust. These characteristics influence the development of the normal fault pattern. We document the differences between the two cited examples in term of structure (spacing of the faults, block sizes, tilt angles) and syn-rift sedimentation (position and extend of the alluvial fans, deltas, conglomerates and carbonates).

Major causes of the extension in both cases are also different: the Gulf of Suez is clearly related to a deep thermal anomaly, which induce a lithospheric and crustal thinning during the early Miocene (23 to 15 Myr). From 15myr, the extension has been stopped, except in the central southern part, and the main tectonic activity is the uplift of the shoulders and Miocene Gulf borders. At the opposite, the data on the Gulf of Corinth does not evidence any abnormal temperature field below the structure, but the Gulf of Corinth is located in a back-arc position and affected by the Westward propagation of the north Anatolian fault. These regional features induce very different subsidence and uplift histories of both zones.