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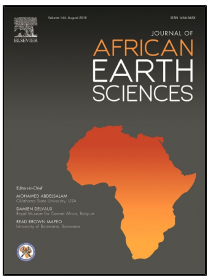

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Distinguishing rift-related from inversion-related anticlines: Observations from the Abu Gharadig and Gindi Basins, Western Desert, Egypt.

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Abstract

Distinguishing the tectonic origin of anticlinal structures is problematic in regions with a complex history of rifting and inversion. We present the results of seismic mapping, in the form of time-depth (isochron) and time-thickness maps to characterize how sedimentary thickness differentials evolved in response to normal faulting and to inversion events on faults within the Abu Gharadig and Gindi Basins in the Western Desert of Egypt. Late Cretaceous rift-related faults in the Abu Gharadig Basin strike NW-SE, W-E and SW-NE. In the eastern part of the basin, a prominent SW-NE trending interbasinal saddle formed in response to preferential subsidence forming half-grabens to its north-west and southeast, during the Mid-Turonian to Santonian interval. Santonian to Palaeogene inversion in the Abu Gharadig Basin developed on its northern basin margin, the absence of SW-NE striking faults in the eastern central basin resulting in any inversion effects being minor. In the central Gindi Basin, Upper Cenomanian to Lower Turonian SW-NE striking rift faults underwent inversion as early as the Mid-Turonian. The orientation of existing rift faults and modification of the local stress fields control the extent to which inversion was taken up in each basin trough time. The Abu Gharadig and Gindi Basins are two of the rift basins developed in West and Central Africa that underwent rifting, inversion and dextral shearing during the Late Cretaceous. We emphasize the value of high-resolution stratigraphic mapping to characterize short-lived and subtle pop-up events that may have gone unnoticed.

Keywords: Anticlines - Rifting – Inversion tectonics - Abu Gharadig Basin - Gindi Basin.