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The regional structure of the Red Sea Rift revised

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The Red Sea Rift has, for decades, been considered a text book example of how young ocean basins form and mature. Nevertheless, most studies of submarine processes in the Red Sea were previously based on sparse data (mostly obtained between the late 1960's and 1980's) collected at very low resolution. This low resolution, combined with large gaps between individual datasets, required large interpolations when developing geological models. Thus, these models generally considered the Red Sea Rift a special case of young ocean basement formation, dividing it from North to South into three zones: a continental thinning zone, a "transition zone" and a fully developed spreading zone. All these zones are imagined, in most of the models, to be separated by large transform faults, potentially starting and ending on the African and Arabian continental shields. However, no consensus between models e.g. about the locations (or even the existence) of major faults, the nature of the transition zone or the extent of oceanic crust in the Red Sea Rift has been reached. Recently, high resolution bathymetry revealed detailed seafloor morphology as never seen before from the Red Sea, very comparable to other (ultra)slow spreading mid-ocean ridges such as the Gakkel Ridge, the Mid-Atlantic Ridge and SW-Indian Ridge, changing the overall picture of the Red Sea significantly. New discoveries about the extent, movement and physical properties of submarine salt deposits led to the Red Sea Rift being linked to the young Aptian-age South Atlantic. Extensive crosscutting transform faults are not evident in the modern bathymetry data, neither in teleseismic nor vertical gravity gradient data and comparisons to Gakkel Ridge and the SW-Indian Ridge suggest that the Red Sea is much simpler in terms of structural geology than was previously thought. Complicated tectonic models do not appear necessary and there appears to be large areas of oceanic crust under the Red Sea salt blankets. Based on this new information, we present a new and straightforward model of the large scale geological and tectonic situation in the Red Sea Rift.