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## Structural Evolution of the Eastern Arabian Terrane: Basement to more than 20% of the World's Petroleum

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Integrated interpretation of potential field, seismic and geological data from the Arabian Plate shows a collage of basement terranes assembled in the Neoproterozoic Pan African Orogeny. The Eastern Arabian Terrane (EAT) spans >1.5 million km<sup>2</sup> through Yemen, Oman, Saudi Arabia and the Gulf, and underlies much of the Zagros Fold Belt. According to USGS figures, more than 20% of the World's total petroleum endowment occurs in basins overlying the EAT.

The EAT is interpreted as a Paleo-Mesoproterozoic continental fragment that amalgamated with adjacent terranes in Oman at ~760-720Ma. Extension and subsidence occurred from ~720-680Ma, with widespread deposition of the Abu Mahara Group and age equivalents. ~680-630Ma collision of the EAT with the Arabian Shield terranes caused deformation at the terrane margins and subtle folding and very low grade metamorphism of older sediments in the terrane interior. Further sedimentation and plutonism occurred from ~630-540Ma, which culminated in the early Cambrian Angudan Event at ~540-520Ma at which time the terranes of the Arabian Plate underwent structural reactivation, widespread erosion and peneplanation. We suggest that pre-Angudan sediments in the Eastern Arabian Terrane are probably sufficiently deformed and metamorphosed to be considered economic basement and form a Neoproterozoic-Early Cambrian fold belt overlying extended Paleo-Mesoproterozoic continental crust.

From the Mid Cambrian to Recent, the EAT formed part of a remarkably stable platform. Tectonic events at the margins of Gondwana exerted a subtle influence on the plate interior, forming sequence boundaries and regional unconformities and subtly influencing subsidence rates. Minor compressional and/or transpressional reactivation of deep-seated Proterozoic basement structures occurred during several of these events, including the Late Silurian (Caledonian), Mid Carboniferous (Hercynian), Late Cretaceous, and Tertiary-Recent. Reactivation of deep-seated basement structures caused very subtle, long wavelength folding of Paleozoic-Tertiary strata, forming most of the major hydrocarbon traps in the Middle East.

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