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Neoproterozoic Arabia – The Angudan/Malagasy orogenic collision of Neoproterozoic India with Africa in a plate kinematic framework

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Eastern and western Neoproterozoic basement Arabia have contrasting tectonic geographies. East Arabia, exposed as the basement of Oman and as inclusions in salt diapirs within the UAE, preserves evidence of Tonian arc magmatism with a minor detrital connection to Palaeoproterozoic crust. The Tonian basement also records a distinct decrease in the age of formation, metamorphism and deformation towards the west that is terminated by the subsurface 'Western Deformation Front' and seismic boundary reported to the west of Mirbat. Basement Oman correlates well with the basement to Rajasthan and Pakistan (and possibly even SW South China) where similar Tonian juvenile volcanic arc-rocks are preserved that, like Oman, pass up into Cryogenian and Ediacaran unmetamorphosed sedimentary rocks that form the NW passive margin of Neoproterozoic India.
These contrast with the basement of Saudi Arabia and Yemen, where pre-Neoproterozoic continental fragments (the proposed Azania and Afif-Abas continents) accreted to the already amalgamated western Arabian-Nubian Shield before the Ediacaran. Ediacaran active margin tectonism is recorded east of the Afif Terrane of Saudi Arabia where juvenile continental arc magmatism continued in the Ar Rayn Terrane until ca. 600 Ma and ophiolite obduction, active margin deposition and greenschist-facies metamorphism occur well into the Ediacaran. The Ar Rayn Terrane is delineated in the subsurface by a distinct positive magnetic anomaly. Other, similar character, N-S magnetic anomalies occur beneath the Rub-Al-Khali Basin that are interpreted to be younger volcanic arcs within the Ediacaran final suture of the Mozambique Ocean that finally closed to form the Angudan/Malagasy orogeny.
In this presentation we outline the geology and tectonic events of the different parts of Neoproterozoic Arabia and place the geology in a full-Earth kinematic model for the evolution of the evolving Mozambique Ocean and its transition into the formation of central Gondwana.