
Basement Control on Structure and Evolution of the Salt Basins of Oman

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The basement of Oman comprises a NE-trending collage of accretionary wedge, ophiolitic, magmatic arc and microcontinental terranes that accreted onto the SE margin of the East Arabian Terrane during the Pan African Orogeny (~850-520 Ma). The character of the basement, its composition and structural grain, and the terrane boundaries have significantly and repeatedly influenced InfraCambrian and Phanerozoic basin evolution and sedimentation.

Oman basement amalgamation was completed at ~730Ma, accompanied by the development of major, regional ~NS-trending fracture/fault zones that were reactivated during accretion, cutting across and offsetting the accreted terranes. These faults were reactivated during extension and deposition of the Neoproterozoic Abu Mahara Group, and during compression when the Oman microcontinent collided with the Arabian Shield. Subsequent reactivation during the InfraCambrian resulted in compartmentalisation of the developing salt basins.

The Ghaba and South Oman Salt basins are relatively narrow and deep, and are underlain by basement formed by the NE-trending belt of accreted terranes. The Fahud Salt basin developed on basement similar to the East Arabian Terrane, a more stable, probably microcontinental terrane ("Fahud Terrane"). During the development of the salt basins and later during post-salt sedimentation and salt movement, subsidence and accommodation was much greater in the Ghaba and South Oman Salt Basins than in the Fahud Salt Basin. During transpression associated with terminal Pan African orogenic activity along the Eastern margin of Africa/Arabia (Angudan event), the terrane boundary between the accreted terranes and the Fahud/East Arabian Terrane reactivated and became the focus of thrusting and inversion. The intensity of this deformation was partitioned by reactivation of the plate-scale NS-trending fracture/fault zones.
