LES BLOCS EXOTIQUES DU SULTANAT D'OMAN. EVOLUTION PALEOGEOGRAPHIQUE D'UNE MARGE PASSIVE FLEXURALE

PILLEVUIT Alain, 1993

PhD adviser: Prof. Gérard STAMPFLI, Institut de Géologie et Paléontologie

Published in Mémoires de Géologie (Lausanne), 1993, No 17

The geodynamic evolution of the late Paleozoic rifting in Oman is marked by a mid Permian thermal uplift of the shoulders. In the late Permian, following the erosion of the shoulders and their transgression, an early passive margin stage took place. Different elements of this margin are now found in the autochtonous and in the nappes.

1. The synrift series are well represented in
2. The Jebel Ramaq (Qamar), with early Permian (Artinskien) platform limestones and a few volcanites lying on a Devono-Silurian basement.
3. The Haushi-Huqf area with early Permian (Artinkien) platform limestones.
4. The Saih Hatat Mountains with early Permian limestones probably associated with volcanites showing a WPB geochimical signature.

   The postrift series are well represented in

5. The Jebel Sumeini with late Permian (Wordian) slope deposits.
6. The Jebel Akhdar with late Permian (Wordian) platform limestones generally lying, with a sharp unconformity, directly on the infracambrian series, or on synrift sediments (Saih Hatat).

   The oceanic series consist of various pelagic sediments such as

7. Red nodular ammonoids and trilobites with manganese coating of typical Hallstatt facies, and of Wordian age, lying on pillow lava of MORB type (as seen in RUSTAQ).
8. The late Permian (Murgabien) platform limestones, covered by Triassic red nodular ammonoids of Halstatt facies and Ammonitico-Rosso, followed by probably early Jurassic Calcari ad Aptici limestones, seem to represent sedimentary covers of tilted blocks lying at the foot of the margin (such as the exotic block of Ba'id). These facies are resedimented in the form of breccia consisting of platform limestones, deposited in basin-type to abyssal pelagic sediments during the three main periods (Permian-early Triassic-early Jurassic).
9. Late Triassic (Carnien-Norian) platform limestones, covered by middle Jurassic Ammonitico-Rosso limestones and upper Jurassic to lower Cretaceous Calcari ad Aptici limestones. This sequence lies on pillow-lava and tuffites with a typical within plate signature. This sequence is interpreted as representative of "atoll-like" seamount (such as the MISFAH exotic block).

In conclusion we propose that a rifting phase affected the Gondwanian border in early Permian (Qamar, Haushi, Saih Hatat?). It was followed by a mid Permian

oceanisation process accompanied by the rift shoulder uplift (Jebel Akhdar) and followed by sea-floor spreading that began in the late Permian (Rustaq and other). The emplacement of seamounts of transform type or hot-spot type (such as the Misfah), occured mainly in the late Triassic. After a passive margin stage lasting for 150 Ma., the permo-triassic oceanic and slope sediments were incorporated into an accretionary prism following the onset of a syn-oceanic subduction zone. The accretionary prism obducted onto the Oman margin represents the Hawasina nappes. The Semail ophiolite, tectonically overlying the Hawasina nappes represents a back-arc basin formed during the early Cretaceous to the north of the accretionary prism. It is important to note that the geochemistry of the Hawasina volcanites shows mainly within plate affinities (already observed by Béchennec, 1988). This observation could be explained by the morphology of the oceanic crust, that show topographic high such as atolls or basaltic plateaus. These will preferably be introduced in the accretionary prism instead of the "normal" oceanic crust lying in a lower topographic position. The breccia observed at the foot of margin and in oceanic environments were formed during three major periods which are:

- the upper Triassic that corresponds to a major tectonic event related to the accretion of the Iranian blocs to the Eurasian continent and the onset of the Neotethys subduction.
- the Triassic-Jurassic boundary corresponding to a major eustatic event.
- the lower Cretaceous that corresponds to a major tectonic event related to the creation of a intra-oceanic subduction zone leading to the formation of the Semail ophiolite.