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The DEPOSITIONAL and TETONIC EVOLUTION of the SOUTHERN MARGIN of the NEOTETHYS OCEAN during the LATE CRETACEOUS: EVIDENCE from the NORTHERN UNITED ARAB EMIRATES

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The geological evolution of the United Arab Emirates (UAE) during the Mesozoic and Cenozoic can be directly related to the opening of the southern Neotethys Ocean during the Triassic and its eventual closure in the late Cretaceous to Palaeogene. The entire Permian to early Cretaceous carbonate platform succession, the Hajar Supergroup, deposited on the Arabian continental passive margin is exposed within the mountains of the Musandam Peninsula. Sediments laid down within the deeper parts of the southern Neotethys ocean are exposed within the adjacent Dibba Zone. Although the majority of the rock units of the UAE were formed within the Neotethys Ocean, their present-day distribution is largely the result of processes associated with closure of this ocean. Geological mapping (e.g. Phillips *et al*., 2006a and b; Goodenough *et al*., 2006) undertaken by the British Geological Survey for the Ministry of Energy (Petroleum & Minerals Sector, Minerals Department) has produced the first detailed maps of the Dibba Zone and the adjacent carbonate platform margin at a scale of 1:25 000. This work has enabled a unified stratigraphical framework (building upon the work of Glennie *et al*., 1974) to be erected, and mapped, across the Dibba Zone and southern Musandam mountains. This has enabled a more detailed model for the depositional and tectonic evolution for the UAE sector of the Neotethys Ocean to be established (see Styles *et al*., 2006).

The late Cretaceous was a period of major change within the southern Neotethys Ocean. The prolonged period of stability which had previously characterised sedimentation on the carbonate platform margin finally ended with a period of uplift and erosion. The succeeding late Cretaceous Aruma Group, deposited following uplift and erosion of the platform, comprises a shelf margin sequence which includes reef deposits, passing laterally into platform-derived turbiditic slope deposits (Mayhah Formation) together with platform-edge debris flow conglomerates (Ausaq Conglomerate Formation) generated during the break up of this margin. The upper part of the Aruma Group (Muti Formation) records the initiation of the foreland basin. The deeper water equivalents of the Aruma Group carbonate platform succession, which include carbonate turbidites, pelagic lime-mudstones, siliceous mudstones and cherts, occur within the Dibba Zone. These deep water sedimentary rocks also include a number of regional scale mélange/olistostrome units (Kub and Wadi Sanah mélange

formations), which were generated in response to active faulting during the break up of the platform margin and obduction of the Oman-UAE ophiolite during Upper Cretaceous times.

In Dibba Zone, the sediments laid down within the deeper parts of the Neotethys Ocean were deformed during the obduction of the ophiolite and now crop out within a complex imbricate thrust stack. The late Jurassic to upper Cretaceous Hamrat Duru Group, deposited on the slope of the ocean basin comprises a sequence of turbiditic clastic limestones and conglomerates (Dhera and Dibba limestone formations) that interdigitate with deep-water, basinal facies rocks (Shamal Chert Formation). During the late Cretaceous deposition within Neotethys was punctuated by localised volcanism leading to the eruption of the Dibba and, to the south, Hatta volcanic rocks.

Two main tectonic events have effected the rocks of the Dibba Zone and southern Musandam mountains: (i) the obduction of the Oman-UAE ophiolite onto the eastern margin of the Arabian Platform during the Late Cretaceous (c. 90 to 95 Ma - Allemann & Peters 1972; Lanphere 1981; Lippard *et al*., 1986); and (ii) later (post-obduction) thrusting and folding which affected both Mesozoic and Palaeogene sedimentary sequences (Ricateau & Riché 1980; Searle *et al*., 1983). The intensity of the late Cretaceous deformation (folding and thrusting) decreases towards the northwest across the Dibba Zone, consistent with ophiolite emplacement from the southeast.

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