

**AAPG International Conference
Barcelona, Spain
September 21-24, 2003**

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Stratigraphy and Sedimentology of the Middle Ordovician Hawaz Formation, Murzuq Basin, Libya

The Hawaz Formation is an Llarvirnian-Llandeillian oil-bearing unit forming part of the sedimentary column of the Murzuq Basin, in SW Libya. The Formation crops out in structural highs along the basin boundaries. We present the results of a geological field study carried out in the Gargaf High, at the northern basin edge. In the studied area, the Hawaz Formation is more than 140 m thick. It conformably overlies the Ash Shabiyat Formation (Arenigian-Llarvirnian in age). Their upper boundary is a glacially related erosive surface overlain by Upper Ordovician Formations named Melaz Shogran and Mamuniyat. The Hawaz Formation is mainly made of fine-grained, clean quartzitic sandstones with interbedded thin beds of silty sandstones and siltstones. The vertical facies arrangement shows an upward evolution from clastic deposition in an open and shallow marine environment to a nearshore, tidal- and storm-influenced environment. The open marine deposits are represented by the lower third of the succession and consists of tabular beds of massive, quartzitic sandstones, highly bioturbated by Skolithos. Tidal and storm facies associations along with shoreface to beach facies associations characterize the nearshore deposits. Major subtidal bars (up to 5 meters thick) have been recognized. These nearshore deposits show increased ichnofossil biodiversity, and Skolithos, Siphonichus, Diplocraterion, Planolites and Cruziana are abundant. The bioturbation degree varies strongly. The sedimentological characterization of these deposits allows us to establish their sequential stratigraphic subdivision.