

## 11.2 **Thickness, Compositional and Textural Variability, and Genesis of El-Lajjun Oil Shale, Central Jordan**

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The Upper Cretaceous oil shale of Jordan is part of the paleo-Tethyan ocean shore belt. These formations are deposited in synclinal basins formed during the tectonic evolution of the Syrian Arc System. Jordanian oil shale is part of Muwaqqar chalk marl formation of Maastrichtian – Palaeocene. This study focuses on EL-Lajjun basin in central Jordan, and using petrographic, organic and inorganic geochemical techniques, aims to understand the processes that determine oil shale thickness, compositional and textural variability.

In the El-Lajjun basin, oil shale varies in thickness from 30 to 60 m. Isopach maps drawn from available thickness data show coincidence of maximum depth of oil shale bottom surface with their maximum thickness. Phosphorite occurs below the oil shale and chalk above. Concretionary carbonates are associated with oil shale horizons depleted in organic matter. The TOC ranges from 1 to 28%. TOC-rich oil shale horizons are mostly laminated and locally bioturbated. Benthic foraminifera, cement content, pyrite and mottling decrease toward these laminated horizons. Biomarker study shows that the OM is immature to low maturity level and its source is primarily marine with some contribution from terrestrial sources probably deposited under anoxic bottom water conditions.

Combinations of thickness data, lithological and textural variability suggest paleotectonic or sea level control. The deposition probably occurred under sub-oxic to anoxic conditions during periods of relatively low sea level possibly with reduced water circulation and increased primary productivity.