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EARLY JURASSIC DEPOSITIONAL HISTORY
OF THE NORTHERN MARGIN OF THE
CENTRAL HIGH ATLAS, MOROCCO

by

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ABSTRACT

The Lower Jurassic (Liassic) rocks on the northern margin of the central High Atlas, Morocco, reflect sedimentation on the northern side of a seaway, the High Atlas trough, which first developed as a continental rift in the Triassic or Late Paleozoic. In the Liassic, the Tethys flooded the High Atlas trough, and carbonate sedimentation was initiated. The purpose of this research was to interpret the Liassic depositional history and reconstruct the paleogeography of this area.

Six major Liassic stratigraphic units were identified, being mainly limestones and marlstones. Units 1A and 1B are the oldest Liassic rocks, and are exposed on the Oran Meseta to the north of the High Atlas, and along the High Atlas margin, respectively. Unit 1A is characterized by algal boundstones and claystones, interpreted to be of tidal-flat origin. Unit 1B consists of skeletal, pelletal, oolitic packstones and grainstones, interpreted to be of shelf-margin origin.

Intertonguing with and overlying unit 1B, unit 2 thickens basinward, and consists of regularly-bedded carbonate mudstones, wackestones and varying amounts of turbidite packstones, cyclically interbedded with varying amounts of marlstone. Unit 2 is punctuated by slumps and debris beds near the margin of the basin, and is interpreted as a slope, base-of-slope apron and basin-floor deposit. Overlying unit 2 and thickening basinward, unit 3 consists of marlstones, cyclically interbedded with varying amounts of carbonate mudstones, wackestones and turbidite

packstones. Units 2 and 3 are locally separated by a condensed zone. Unit 3 displays four orders of cyclicity, probably related in part to climate cycles controlled by the Milankovitch affect.

In fault contact with unit 3, unit 4A consists of a large (3 x 30 kilometer) block of skeletal, oolitic, intraclast grainstones and packstones of shallow-water origin. Overlying unit 4A and intertonguing with unit 3, unit 4B is composed of debris beds and turbidites of deep-water origin. Several lines of evidence suggest that the block was a large gravity-slide structure, with the associated debris deposited in its wake and backed up behind it.

The vertical succession from platform-margin to basin-floor deposits indicates that relative sea level was rising during the Liassic, probably related to both eustacy and tectonic subsidence. Active downfaulting of the margin is indicated by drowning of the platform-margin environments and the base-of-slope debris apron. Continued deepening upward was probably due to eustatic sea-level rise and passive subsidence. The unit 2/unit 3 condensed zone was probably caused by a rapid rise in sea-level, which was followed by a highstand and drop that exposed the platform. A portion of the platform margin broke off and slid into the basin, to be followed by and covered with deep-water debris sheets, turbidites, marlstones, wackestones and mudstones.

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