

**FACIES CHANGES AND ITS FOSSIL RECORD THROUGH THE BARREMIAN – APTIAN  
TRANSITION ON A CARBONATE PLATFORM SETTING OF NORTEAST MEXICO: THEIR  
ENVIRONMENTAL AND BIOCHRONOSTRATIGRAPHIC SIGNIFICANCE**

Ricardo **BARRAGÁN-MANZO**, Florentin J-M. R. **MAURRASSE**, Reinaldo **ROJAS-CONSUEGRA**

Northeast Mexico is characterized by a sedimentary cover mainly composed of Upper Jurassic-Lower Cretaceous marine facies. Excellent outcrops of stratigraphic sequences of Barremian-Aptian age are well-exposed in this area. The classical paleogeographic reconstructions of northeast Mexico stand out the development of extensive shallow carbonate platforms during the Barremian and early Aptian times. The drowning of those platforms at the end of the early Aptian is envisaged via an exaggerated deepening of the sedimentary conditions through a global transgressive event.

Current research deals with a sedimentary sequence that records the Barremian-Aptian transition within the Durango State in northeast Mexico. The sequence is composed of formal lithostratigraphic units described as the Cupido Formation of Barremian-early Aptian age, and the La Peña Formation, deposited from the late-early through the late Aptian.

Detailed analyses that included vertical variations of microfacies and their micropaleontological components, ammonite assemblages, and organic carbon contents throughout the studied section, set the basis for the characterization of the depositional environments and the prevailing paleoceanographic conditions through the Barremian-Aptian transition, as well as for the

evolution of those conditions during the rest of the Aptian.

The Barremian-Aptian transition in the area of study is recognized through the stratigraphic ranges of index species of benthonic foraminifera in shallow carbonate platform facies that belong to the top of the Cupido Formation. Those sedimentary conditions prevailed through the remaining of the early Aptian. By the end of the early Aptian, the shift in the sedimentary regime from the Cupido carbonate platform into facies of the La Peña is coincident with increments on the Total Organic Carbon content from less than 1% to values that oscillate between 3 and 5%. The shift is also characterized by an increase on the terrigenous input and it is also coeval with the sudden appearance of planktonic fauna and ammonites, and with a marked impoverished benthonic production, suggesting a depletion of the dissolved oxygen on the basin in relation to a local sea level rise.

Biochronostratigraphically, these local changes in the sedimentary conditions can be correlated to the Tethyan standard ammonite zone *Dufrenoyia furcata* of the late-early Aptian. By middle Aptian, the recovery of the benthonic production and a drop on the total organic carbon values below 1%, suggest a reestablishment of the normal paleoceanographic conditions.

The dysoxic conditions recorded herein at the beginning of deposition of the La Peña Formation are coincident in time with other reports of global temperature increments of the oceans associated to high magnitude magmatic events. Those conditions may have expanded the Oxygen Minimum Zone over the Aptian platforms on a global scale. Thus, the sudden interruption of the benthonic production

is herein interpreted as a direct effect of these changes on the bottom waters rather than an extreme deepening of the basin. In other words, it is assumed herein that the absence of benthonic elements in these facies exaggerates the deepening effect on the paleobathimetric interpretations of the Aptian basins of northeast Mexico.

**Ricardo BARRAGÁN-MANZO**

Departamento de Paleontología,  
Instituto de Geología,  
UNAM. Ciudad Universitaria,  
Coyoacán, C. P. 04510, México, D. F.  
MÉXICO  
e-mail: rbarra01@hotmail.com

**Reinaldo ROJAS-CONSUEGRA**

Museo Nacional de Historia Natural  
Obispo 61, Plaza de Armas  
Habana Vieja, C. P. 10100, C. Habana  
CUBA  
e-mail: rojas@mnhnc.inf.cu

**Florentin J-M. R. MAURRASSE**

Department of Earth Sciences,  
Florida International University,  
University Park Campus, Miami,  
Florida, 33199  
U.S.A  
e-mail: maurrass@fiu.edu

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