

The Iberian Middle Jurassic carbonate-platform system: Synthesis of the palaeogeographic elements of its eastern margin (Spain)

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Abstract

During the Middle Jurassic, the domain of the Iberian and Catalan Coastal ranges of eastern Spain was occupied by a system of fault-controlled carbonate platforms that flanked the Iberian Massif to the East. This platform system marked the transition between the shelves of the Alpine Tethys and the Central Atlantic Ocean. The palaeogeographic reconstruction of the Iberian Middle Jurassic platform system is based on more than 199 surface sections and 37 wells. From southwest to northeast, eight main palaeogeographic elements with associated characteristic facies are recognized. These represent a system of horsts and grabens. In the southwest, the Internal Castilian Platform is characterized by the frequently dolomitized oolitic and restricted facies of the Yemeda Formation. To the northeast, the NW-trending open-marine carbonate environments of the External Castilian and Aragonese platforms were separated by the fault-controlled El Maestrazgo High that is characterized mainly by the dolomitized Rafales Formation. The External Castilian and Aragonese platforms consist from bottom to top of the microfilament mudstones to wackestones of the El Pedregal Formation, the bioclastic and oolitic grainstones to packstones of the Moscardon Formation, and the Domeño Formation, that reflects a return to an open-marine low-energy wackestone to mudstone facies, locally containing patches of oolitic grainstones. The highly subsiding Tortosa Platform, represented by the Sant Blai, Cardo and La Tossa formations, is bounded by the dolomitic facies deposited on the El Maestrazgo and the Tarragona highs, and by the Catalan Massif where no Middle Jurassic deposits have been recorded. The open-marine facies and condensed sections of the Beceite Strait separated the Aragonese and Tortosa platforms. A regional stratigraphical gap spanning the upper Callovian Lamberti Zone to the lower Oxfordian Cordatum Zone is evident. A system of northwest- and northeast-trending normal faults controlled thickness and facies distribution. Data from the Iberian carbonate-platform system indicate that expanded sections were not necessarily associated with open-marine environments. Condensed and expanded sections are developed in open and restricted-marine facies, even on such palaeogeographic highs as the El Maestrazgo High. Restricted and shallow-marine environments occasionally developed in parts of the External Castilian Platform.

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1. Introduction

Regional Middle Jurassic palaeogeographic reconstructions of the early opening stage of the Central Atlantic Ocean and the Alpine Tethys indicate that the East-Iberian area was occupied by a carbonate-plat-

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form system, the facies development and subsidence patterns of which were controlled by active faults (Fig. 1; Ziegler, 1990; Bassoullet et al., 1993; Enay et al., 1993; Thierry, 2000; Vera, 2001, 2004; Vera et al., 2001; Stampfli and Borel, 2004).

In the fold-and-thrust belts of the Iberian and Catalan Coastal ranges of Spain, which evolved by Paleogene inversion of Mesozoic rifted basins (Salas et al., 2001), Middle Jurassic carbonates are exposed under outstanding outcrop conditions over a distance of more than 500 km. In the context of our studies, we

analysed in these areas 199 Middle Jurassic surface sections and data from 37 boreholes (Fig. 2). This permitted us to develop a detailed reconstruction of the palaeogeographic elements of the East-Iberian Middle Jurassic carbonate-platform system. In the Iberian Range, Middle Jurassic carbonates, formerly attributed to the “middle portion” of the Chelva Formation (Gómez and Goy, 1979), were recently subdivided into several lithostratigraphic units (Gómez and Fernández-López, 2004a,b) on the basis of their distinct facies development that can be related

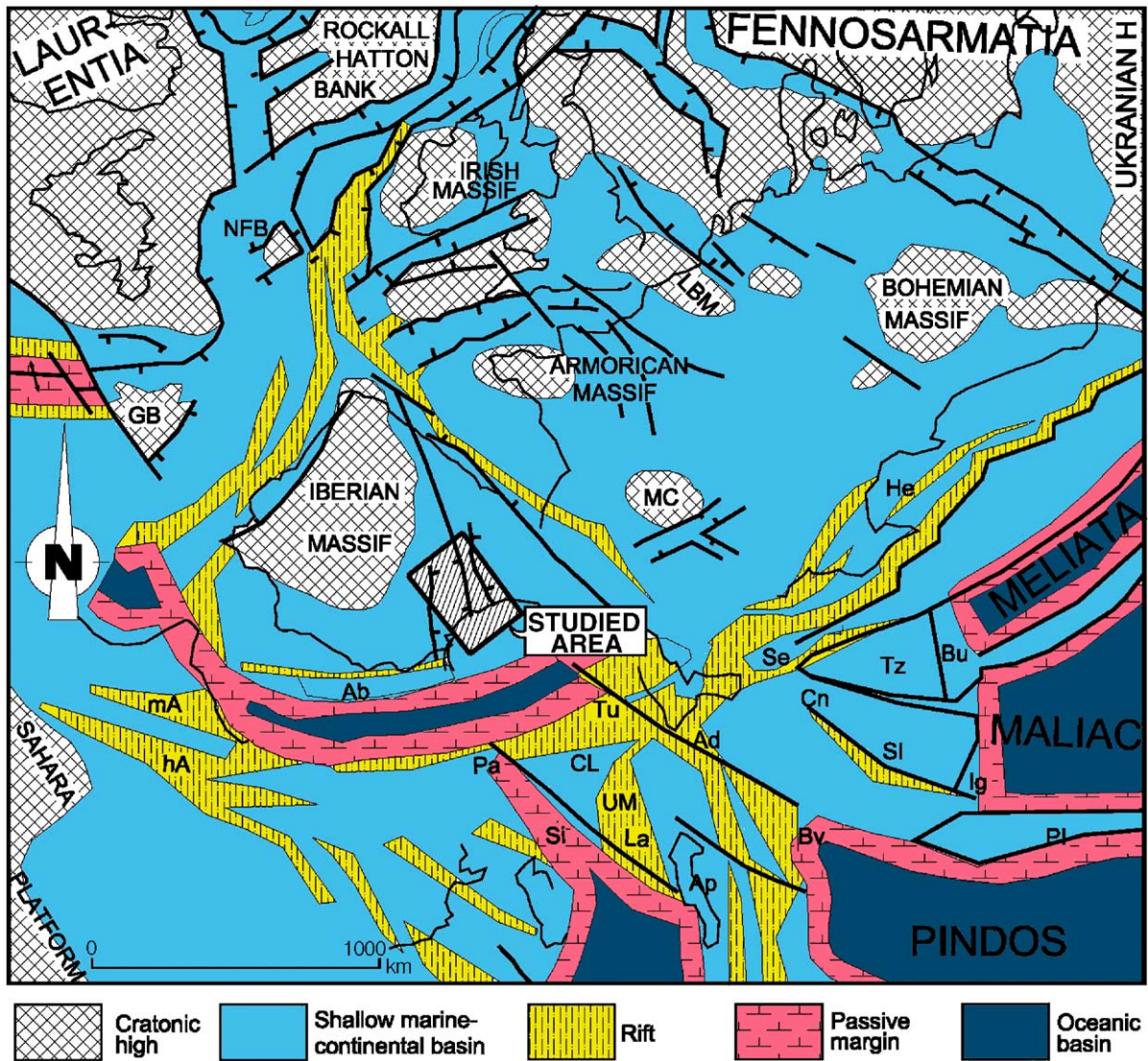


Fig. 1. Middle Jurassic palaeogeography of the Western Tethys and the Proto-Atlantic Ocean (Ziegler, 1990; Stampfli and Borel, 2004; modified) and location of the studied area. Ab: Alboran. Ad: Adria s. str. Ap: Apulia s. str. Bu: Bucovinian. CL: Campania Lucania. Cn: Carnic-julian. GB: Grand Bank. hA: High Atlas. He: Helvetic rim basin. Ig: Igal trough. La: Lagonegro. LBM: London-Brabant Massif. mA: Middle Atlas. MC: Massif Central High. NFB: East Newfoundland Basin. Pa: Panormides. Pl: Pelagonian. Se: Sesia (western Austroalpine). Si: Sicilian. Sl: Slavonia. Tu: Tuscan. Tz: Tizia. UM: Umbria-Marches.

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