



Discussion

Comment on the paper “Lago Mare and the Messinian salinity crisis: Evidence from the Alboran Sea (S. Spain)” by Do Couto et al. (2014)



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ARTICLE INFO

Article history:

Received 23 July 2014

Accepted 16 October 2014

Available online 7 November 2014

Keywords:

Lago-Mare event
Latest Messinian
Earliest Pliocene
Malaga basin
Alboran Sea

ABSTRACT

The stratigraphic and temporal framework of the sedimentary filling of the Messinian–Zanclean transition in Malaga basin is discussed. From this framework, the main features of an alternative model for the Lago-Mare event in the Mediterranean are outlined.

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1. Introduction

In a recent paper, Do Couto et al. (2014) highlighted the importance of the outcrop of Lago-Mare sediments in Malaga (Fig. 1) for providing a new environmental, sedimentological, and stratigraphic context of the Lago-Mare event in the Mediterranean. We publicized this outcrop for the first time some years ago (Guerra-Merchán and Serrano, 2003) and subsequently described its sedimentary and paleontological characteristics more at length (Guerra-Merchán et al., 2008, 2010). Although Do Couto et al. (2014) recognized the authorship of our findings, we disagree with some of their stratigraphic, sedimentary, and chronostratigraphic interpretations. Also, they attribute to us some statements that need to be refuted or qualified. In order to clarify these points, we present this note in response.

2. On the lithostratigraphic arrangement of the latest Messinian-earliest Pliocene formations in the Malaga area

Classically, the post-orogenic filling of the Malaga basin has been considered to be made up of three main lithostratigraphic units: i) a Tortonian calcarenitic and conglomeratic marine unit outcropping in the vicinity of the present-day course of the

Guadalhorce river (Pizarra-Álora-Cártama area); ii) a Pliocene marine unit composed mainly of sandy silts and marls, widespread throughout the basin; and iii) an upper Pliocene?–Quaternary continental unit made up by several generations of alluvial fan and plain systems, and of travertines. Estévez González and Chamón (1978) pointed the presence of the planktonic foraminifera *Globorotalia margaritae* and *Globorotalia puncticulata* in the Pliocene unit, but we have not found this latter species in a comprehensive sampling throughout the entire Malaga basin, and thus its depositional time-span must be restricted to the early Zanclean. Nonetheless, *G. puncticulata* appears in the nearby Torremolinos and Fuengirola areas, where the marine deposition continues during the late Zanclean. Since Guerra-Merchán and Serrano (2003), it has been considered that the early Zanclean marine filling in the Malaga basin consists of three stacked lithostratigraphic units, namely PI-1, PI-2 and PI-3. In addition, below the Pliocene formations, latest Messinian Lago-Mare type sediments (LM unit) separated in two successive sequences outcrop in the northern part of the Malaga basin (Mendelín-San José area).

Given this chronostratigraphic framework (Fig. 2), a major discrepancy with Do Couto et al. (2014) relates to the stratigraphic interpretation of the latest Messinian-earliest Zanclean deposition in the northern Malaga area. For these authors the entire sedimentation during this interval resulted from a single sedimentary scenario featured by a Gilbert-type deltaic system and basinward thinner facies, where Lago-Mare and marine conditions coexisted, depending on the place and time. Within this system a main Guadalmedina fan delta at El Túnel, and a subsidiary Mendelín fan delta can be distinguished.

DOI of original article: <http://dx.doi.org/10.1016/j.marpetgeo.2014.01.018>.

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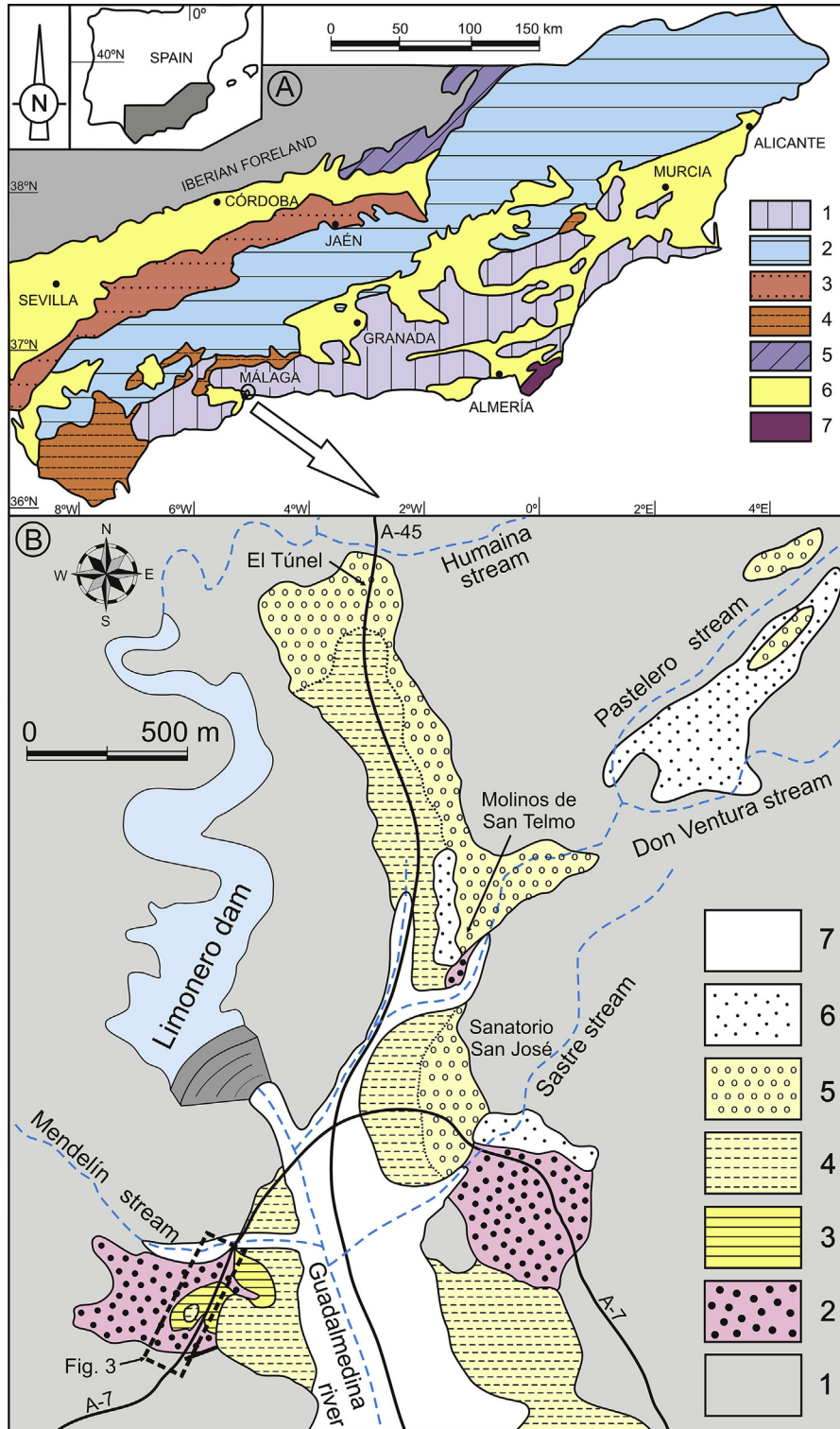


Figure 1. A. Location of the studied area in the geologic context of the Betic Cordillera. 1: Internal Zones; 2: External Zones; 3: Subbetic olistostrome in Miocene deposits of the Guadalquivir basin; 4: Campo de Gibraltar Flysch units; 5: Undeformed cover of the Iberian Massif; 6: Neogene postorogenic basins; 7: Neogene volcanic rocks. B. Geological scheme of the study area. 1: Basement (Malaguide Complex); 2: LM unit (latest Messinian Lago-Mare deposits); 3: Pl-1 unit (earliest Zanclean marine deposits); 4: Marls and sands of the Pl-2 unit (early Zanclean marine deposits); 5: Conglomerates and sands of the Pl-2 unit (early Zanclean deltaic marine deposits); 6: Pleistocene alluvial deposits; 7: Recent fluvial deposits.

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