

Paratethyan ostracod immigrants mark the biostratigraphy of the Messinian Salinity Crisis

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During the last fifteen years, several studies have been devoted to the ostracod assemblages recovered from Mediterranean deposits referable to the Messinian Salinity Crisis (MSC) (CIESM 2008). The studied sections and boreholes are located throughout Mediterranean, from the Malaga Basin (Spain) to the Adana Basin (Turkey). Some of these successions were studied in a multidisciplinary perspective, leading to a reliable correlation with the LASKAR et al. (2004) insolation curve and, thus, to a detailed chronostratigraphy. In this way, it was possible to constrain the age of some Paratethyan ostracod bioevents of migration into the Mediterranean area, in a time-interval spanning from 5.96 to 5.33 Ma.

The proposed biostratigraphic scheme based on ostracods is made at the base by a barren hyperhaline interval (5.96 to c. 5.59 Ma) linked to the depletion of the Mediterranean marine floras and faunas in correspondence of the deposition of thousands of meters-thick gypsum deposits (Step 1 sensu CIESM 2008), followed by two ostracod biozones: the new *Loxococoncha mülleri* Biozone which spans the lower post-evaporitic Messinian (c. 5.59–5.40 Ma, Steps 2.1 and 2.2 *partim*, sensu CIESM 2008), and the *Loxocorniculina djafarovi* Biozone, arose by CARBONNEL (1978) and here emended, which covers the upper post-evaporitic Messinian (5.40–5.33 Ma, Step 2.2 *partim*, sensu CIESM 2008).

The *Loxococoncha mülleri* Biozone is defined as an interval zone: its lower boundary corresponds to the first occurrence (FO) of the Paratethyan species *L. mülleri* (MEHÈS) in the Mediterranean area, whereas its upper boundary is represented by the FO in the Mediterranean of the Paratethyan ostracod *Loxocorniculina djafarovi* (SCHNEIDER in SUZIN). Within this biozone the ostracod assemblages are scarce and oligotypic, largely made only by *L. mülleri* and *Cyprideis agrigentina* DECIMA. Only in the upper part (from 5.42 to 5.40 Ma) two other Paratethyan species occur: *Loxococoncha eichwaldi* (LIVENTAL) and *Tyrrhenocythere pontica* (LIVENTAL).

The *Loxocorniculina djafarovi* Biozone is defined as a local total distribution zone, since its lower and upper boundaries correspond respectively to the FO and last occurrence (LO) of *L. djafarovi* in the Mediterranean area. Within this biozone the ostracod assemblages are abundant and well diversified, mainly made of Paratethyan immigrants.

During the last Messinian precessional cycle, the Paratethyan contingent abruptly increases its biodiversity, following the global humid climatic phase recognized by GRIFFIN (2002) that matches the oscillation of the LASKAR 2004 curve. This humid phase probably triggered more favourable water connections between Mediterranean and Paratethys.

The new biostratigraphic zonation proposed in this paper corresponds to the Non-Distinctive Zone of the Mediterranean Planktonic Foraminifer biozonation (IACCARINO et al. 2007) and to the “Salinity Crisis” interval of the Mediterranean Calcareous Nannofossil biozonation (RIO et al. 1990; RAFFI et al. 2003; DI STEFANO & STURIALE 2010).

The *Loxococoncha mülleri* Biozone and the *Loxocorniculina djafarovi* Biozone had already been informally depicted by BONADUCE & SGARRELLA (1999) who named them respectively “Lago-Mare Biofacies 1” and “Lago-Mare Biofacies 2” and by IACCARINO & BOSSIO (1999) respectively as “Lago-Mare Assemblage (*Cyprideis* assemblage)” and “Paratethys Assemblage (*Loxococoncha djafarovi* assemblage)”.

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