

Between local zones and MN units: A new inter-basinal rodent zonation for the late Neogene of Spain

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ABSTRACT

Since the appearance of the first major magnetostratigraphic studies covering the late Neogene of Spain (e.g., Opdyke et al., 1997; Garcés et al., 1998) the number of Spanish continental sections with a correlation to the Geomagnetic Time Scale has steadily grown. Nonetheless, well-calibrated sections with a dense record are still rare, between-basin biostratigraphic correlation is not straightforward, and ages of uncalibrated sites are poorly constrained. Given the overall similarity of rodent assemblages between Iberian basins during the interval MN11–MN17 (9–2 Ma), the definition of a system of Iberian rodent zones for this interval is a logical and necessary step leading to improved correlations. Our revision thus entails the integration of local biozonations into a single Iberian biostratigraphic framework. The inferred series of zone boundary ages are used to improve the age estimates for most Iberian micromammal sites.

The chronological backbone in our approach is formed by the available Iberian magnetostratigraphic records (Teruel, Cabriel, Júcar, Jumilla-La Celia, Fortuna and Guadix-Baza Basins). After analyzing similarities in taxonomic composition and turnover across basins with a defined biozonation (Teruel, Bajo Segura, Alcoy, Granada and Guadix-Baza Basins), 15 Iberian biozones were defined for the 9–2 Ma interval. Age uncertainty intervals for each boundary and for most Iberian micromammal sites were inferred using additional information on local sedimentation and/or evolutionary rates.

Among our results are new ages for the latest Tortonian and earliest Messinian (MN12–MN13 transition, 8–7 Ma), a thus far poorly dated interval on the Iberian Peninsula. The new chronology for this interval is based on the integrated stratigraphic records of the Jumilla-La Celia and Teruel Basins. Sections in the Jumilla-La Celia basin (eastern Betic Cordillera; Van Balen et al., 2015) were sampled paleomagnetically, further constraining the ages of various MN12-correlative sites (Van Dam et al., 2014). Finally, regular bedding patterns in sections near Conclud in the Teruel Basin (eastern Central Spain) were interpreted cyclostratigraphically and used as a tool in addition to magnetostratigraphy for dating several classical and newly sampled MN12-correlative mammal sites in the area.

KEYWORDS: Neogene; Spain; Rodentia; Biostratigraphy; Geochronology.

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