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# Magnetostratigraphy of Early Miocene mammal-bearing continental sediments of the Tudela Formation (western Ebro basin)

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The Early Miocene Ramblian is, among the European Neogene continental stages, the one whose chronologic calibration is less developed. The Ramblian was defined in the Calatayud-Daroca basin, where the lack of a reliable stratigraphic context makes the magnetostratigraphic dating of the abundant fossil localities unfeasible. A similar situation is faced in the Vallés-Penedes basin, where discontinuous magnetostratrigraphic data do not suffice to date the relatively-abundant mammal faunas. In the Swiss molasse, unfavourable lithologies and outcrop conditions prevent unambiguous magnetostratigraphic dating, and therefore independent age constraints are not available. On the contrary, excellent magnetostratigraphic data are available for long Ramblian sediment successions in the central Ebro basin, but the lack of mammal localities also prevent any attempt for calibration. Here we present new magnetostratigraphic data from the fluvio-lacustrine sediments of the Tudela Formation, which crops out extensively at the central sector of the western Ebro basin. This formation hosts several mammal localities that, although not as abundant and rich as in other basins, allow proper identification of Ramblian biozones A and Z. The excellent exposure conditions, which allow detailed correlation of long sedimentary sections, along with the good paleomagnetic quality of the sediments, provide a first step into the calibration of Ramblian faunas. The potential for further paleontological findings, both in Ramblian sediments and lower in the sedimentary succession, makes the Tudela Formation a reference rock unit for calibrating the Early Miocene European continental stages.