

Searching for Paleogene hyperthermals in the Betic External Zones, south Spain: preliminary results and perspectives

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The Betic External Zones constitute the westernmost segment of the Tethys Seaway northern margin, transformed into a thrust-and-fold belt during the Miocene. Two main domains, the Prebetic and Subbetic Zones, are classically recognized (Fig. 1), both containing extensive outcrops of Paleogene marine deposits (Vera, 2000, *Revista de la Sociedad Geológica de España*, 13, 345-373). Yet, to our knowledge, the PETM has been conclusively recognized only in two sections of the Subbetic Zone (Alamedilla and Caravaca, Fig. 1), and none of the remainder Paleogene hyperthermals have been reported so far. A research plan was consequently designed to improve this situation, in the assumption that a more extensive regional database would allow a better understanding of the effects of these thermal events. This contribution summarizes the current results of our research.

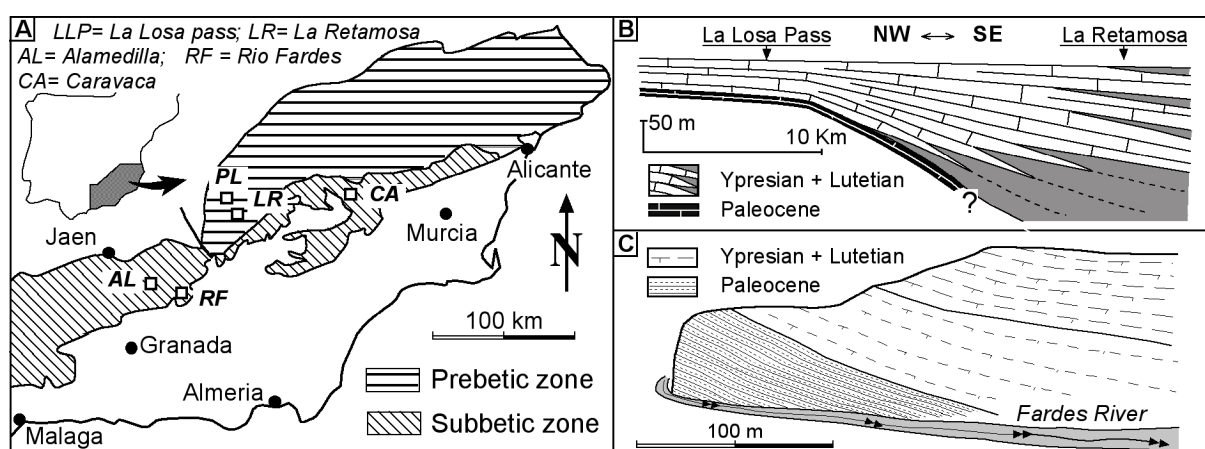


Figure 1 A): Location of the Prebetic and Subbetic zones and reference sections; **B)** Cross-section showing facies and thickness changes in the Prebetic zone; **C)** Sketch of the Fardes River section

Of several sections examined, four were selected for further study: La Losa Pass and La Retamosa in the Prebetic Zone, Alamedilla and Rio Fardes in the Subbetic Zone (Fig. 1). The former two are made up of carbonate ramp deposits (Fig. 1B), while Alamedilla and Rio Fardes contain deep marine hemipelagic and turbiditic deposits, thus representing a wide range of settings. The Paleocene is ca. 50 m thick in the Rio Fardes section, but is mostly made of calciturbidites, and due to a combination of low sedimentation rate and hiatuses, less than 20 m thick in the La Losa Pass and Alamedilla sections. The chances of finding Paleocene hyperthermals in these sections are therefore quite low. However, sedimentation rates increased in all sections during Ypresian and Lutetian times, and so do the possibilities of locating Eocene hyperthermals. Indeed, as mentioned above, the PETM was located long ago at Alamedilla and we have constrained its occurrence to a narrow interval at La Losa Pass. The planktic and benthic foraminiferal content of the Ypresian-Lutetian segment of La Retamosa, Alamedilla and Rio Fardes sections is currently being investigated, to establish their depth range and to pinpoint the position of the rest of the Eocene hyperthermals.

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