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Magnetostratigraphy and stable isotopes record of Paleogene global climate events in a 30Myr expanded foreland basin succession, Isabena river, Southern Pyrenees, Spain

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Past sedimentary archives provide invaluable comparative insights to understand Earth's surface reaction to climate shifts and perturbations. Foreland basins are particularly interesting settings for investigating the sedimentary record of ancient climate perturbations because their high-accommodation and high-sedimentation rates favour protracted and expanded records that complement more distal oceanic records. In addition, due to their proximity to source areas, they provide direct information on the land surface response to the regional impacts of global climate shifts.

However, besides climate signals, the stratigraphic record of foreland basins is subject to a broad range of other factors that make its interpretation challenging. Indeed, foreland basins are naturally sensitive to the influence of tectonics on sediment production and accommodation, either associated with the long-term tectonic evolution of the orogen-basin system, or with the more local and regional shorter-term structural dynamics and geodynamic perturbations. Moreover, if connected to oceanic domains, eustatic sea-level oscillations can also combine with the above factors in determining final stratigraphic patterns.

Over the last two decades, a large body of paleoclimate work has produced new and crucial data on global climate events that have affected our planet. In particular, a suite of global climate perturbations (warming, cooling) have been identified in the Paleogene, thanks to stable isotope of C and O, with some major global warming events such as the PETM, ETM2&3, the EECO, the MECO and others that have fundamental implications for the current global climate crisis.

This well-established climatic template provides a unique opportunity to test the impact of climate

on surface systems in deep time, particularly during the Paleogene hothouse. Therefore, we here present our work on the Isabena section in the South Pyrenean Foreland basin, which is a uniquely continuous and well exposed succession encompassing from the upper Cretaceous to the upper Eocene. We sampled continuously at 1-10 meters intervals over the 4 km-thick succession, from the lower Eocene to the upper Eocene. This sampling results in a new and continuous magnetostratigraphy covering almost 30 Myr of stratigraphic evolution, and a new high-resolution stable isotope record of carbon and oxygen over the Paleogene. These results combined with sedimentological descriptions and stratigraphic analyses reveal the links between important sedimentation changes and global climate events. Preliminary results suggest that hyperthermal events are often associated with enhanced sediment transport and clastic deposition in the basin, while intervals comparatively cooler seem to be more prone to enhanced carbonate accumulation.