Impact of extreme hydrological perturbation on sediment distribution from source to sink, PETM, Spain.

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Sedimentary dynamics and fluxes are influenced by both autogenic and allogenic forcings. A better understanding of the evolution of sedimentary systems through time and space requires us to decipher, and therefore to characterise, the impact of each of these on the Earth's landscape. Given the current increase in the concentration of atmospheric carbon, studying the impact of rapid and global climate changes is of particular importance at the present time. Such events have been clearly defined in the geologic record. Among them, the Paleocene-Eocene Thermal Maximum (PETM) has been extensively studied worldwide and represents a possible analogue of the rapid current climate warming.

The present project focuses on the Southern Pyrenees (Spain) where excellent exposures of the Paleocene-Eocene interval span a large range of depositional environments from continental to deep-marine. These conditions allow us to collect data along the whole depositional system in order to document changes in sediment fluxes and paleohydraulic conditions. Because hydrological conditions have an impact on sediment transport through hydrodynamics, paleoflow reconstructions can shed light on changes in sediment dynamics. This information is reconstructed from the statistical distributions of channel morphologies, characteristic system dimensions including bankfull channel depth and width, and grain-sizes.

With this approach, our aim is to provide both qualitative and quantitative assessments of the magnitude and extent of the perturbation of sedimentary fluxes along an entire source-to-sink system during an episode of extreme climate change. This will lead to a better understanding of the impact of abrupt climate change on earth surface systems in mid-latitudinal areas, with possible implications for current climate adaptation policy.

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