

The Paris Basin Sparnacian: Revision of the lithostratigraphic nomenclature thanks to new sedimentary, mineralogical, chemo- and bio-stratigraphic data

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In the Paris Basin, marine deposits of the Vesles and Montagne de Laon Groups bracket terrestrial to littoral litho-units of the Mont Bernon Group. Since 2007, we study those Sparnacian facies, as they record the effects of a climate crisis linked to a massive release of greenhouse gases into the atmosphere. This hyperthermal event, the Paleocene Eocene Thermal Maximum (PETM), occurred 55.8 Ma ago, was brief (170 ka) and intense (+ 5 to 8°C vs. baseline). Studied as an analogue to the current global warming, it is marked by a negative isotopic excursion of 2 to 6 ‰ of the $\delta^{13}\text{C}$ and coincides with environmental perturbations.

About thirty reference successions have been studied, to which well-described information is incorporated, providing a comprehensive and detailed set of geological data. The aim is to 1) revise the lithostratigraphic nomenclature by integrating new $\delta^{13}\text{C}_{\text{org}}$ and biostratigraphic data, 2) establish well-calibrated correlations in these series prone to hiatuses and lateral facies changes, 3) build a robust framework to reconstitute and discuss the evolution of landscapes, flora and fauna.

We show a prominent record of the PETM over 15-25 m, marked by a strong increase in the sedimentation rate. Steps identified in the $\delta^{13}\text{C}_{\text{org}}$ curves enable fine correlation, 1) especially at the beginning of the event in fluvial and more rarely lagoonal to lacustrine environments, 2) then in alluvial plains, with development of calcretes and variegated paleosols, 3) and in swamps, lakes and lagoons, formed in a context of rising water level. We further observe faunal and floral turnovers, eutrophication of aquatic environments, extreme acme of *Apectodinium* and few other dinoflagellate cyst groups as well as the occurrence of new dinoflagellate species. Lateral facies variations are anchored and paleogeographic maps drawn. It appears that some litho-units previously considered as unique in the Paris Basin (e.g. lignite, plastic clay, fluvial sand, lacustrine limestone and lagoonal sediments) are not synchronous and cannot be regarded as stratigraphic markers for a unique event.

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