Unravelling the PETM record in the "Sparnacian" of NW Europe: new data from Sinceny, Paris Basin, France

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In order to decipher the PETM (Paleocene-Eocene Thermal Maximum) impact on the "Sparnacian" diversified and interconnected paleoenvironments of the Paris Basin, and to ensure correlation of the events and processes identified, a high resolution temporal framework is essential. Historically, the Paris and adjacent basins are the cradle of stratigraphy, where the notion of "Sparnacian" took shape (Dollfus 1880), pointing terrestrial to lagoonal deposits with particular facies and faunas, interstratified between two easily distinguishable Thanetian and Ypresian sandy marine formations. Since that time stratigraphy has evolved, and we refer now to the lithostratigraphy of Aubry *et al*. (2005).

A 31.5 m deep drilling has been augered at Sinceny, a key locality for the "Sparnacian" of the Paris Basin. Various analyses have been performed on the samples collected: granulometry, XRD mineralogy, carbonate and organic carbon contents, biostratigraphy, palynofacies, rock-eval pyrolysis and chemostratigraphy ($\delta^{13}C$ of the dispersed organic matter). Seven lithological units are defined among which five may be attributed to the "Sparnacian" intercalated between fine glauconiferous sands of Late Thanetian and Early Ypresian, with in ascending order: 1) a carbonated silty medium-sized sand, 2) a sandy marl with carbonated concretions and limestone beds, 3) a plastic clay, oxidized at the bottom, but with increasing pyrite upwards, 4) lignite and clay beds, all pyritic but more shelly upwards, 5) a shelly crag with small flint pebbles ("Falun et Sable à Galets Avellanaires de Sinceny": FSGA). The CIE (Carbon Isotopic Excursion), proxy of the PETM, extents over nearly 20 m of the section. In this interval, isotopic values fluctuates around –26 to –28 ‰. They are more negative in the lower part and show short term fluctuations in the upper part, which may reflect changes in depositional environment. The *Apectodinium* acme, another proxy of the PETM, is recorded in the lagoonal facies. Clay minerals do not show any kaolinite influx in relation with the CIE, and interstratified kaolinite/smectite is characteric of the third unit. The palynofacies and pollen and spore assemblages are fairly similar to those from other "Sparnacian" NW European units, with some charcoal beds and *Plicapollis pseudoexcelsus*, Juglandaceae and other taxa acmes. The FSGA is chemostratigraphically (averaging –24 ‰) and biostratigraphically different (*Apectodinium* less abundant, other taxa present or abundant).

Correlation with published sections in the Paris Basin is possible using litho- and bio-stratigraphy, but not chemostratigraphy (Thiry et al, 2006). Indeed such a long, regular and unequivocal CIE had never been recorded in the Paris Basin, neither in Limay, nor in the Mont Bernon and Provins reference sections, all situated on the Paris Basin edges where the deposits are more prone to sedimentary hiatuses. The FSGA unit postdates the PETM episode and evidences the Ypresian s.s. transgression in the "Sparnacian" lagoonal setting. Correlation with the P/E successions of the Belgian, London and Dieppe-Hampshire Basins is also possible, although further high resolution data are necessary in the Paris Basin.