

Isotopic stratigraphy of the Eocene/Oligocene deposits from the Cormeilles-en-Parisis section (Paris Basin, France)

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The Cormeilles-en-Parisis quarry was one of the most important open-mines for gypsum extraction in Europe in the 19th century. The sedimentary formations between the “Deuxième masse de gypse” and the “Sables de Fontainebleau” including the **Eocene - Oligocene transition** were continuously accessible.

An isotopic study (stable isotopes of carbon and oxygen) was carried out on the calcium carbonate component of the sediments. This study is the first of importance on this topic since the previous work of Fontes et Létolle (1976).

The isotopic record appears to be independent of the lithological variability (gypsum, marl and limestone). No relationship between isotopic values and CaCO₃ content is observed. The $\delta^{13}\text{C}$ trend shows a relatively stable evolution of the ratio (-3 to -4‰) from the “Deuxième masse de gypse” to the top of the “Argile verte de Romainville”. However, a negative excursion occurs in the “Calcaire de Sannois” (-7.7‰). Then, the ratio increases gradually, while showing short and significant fluctuations from 2‰ in amplitude, up to the top of the studied section (“Sables de Fontainebleau”, +1‰).

The evolution of the $\delta^{18}\text{O}$ shows a progressive and sinusoidal increase (-5‰ to -1‰) on which 3 short positive peaks of amplitude higher than 3‰ are superimposed. The first one is located at the top of the “Marnes bleues d'Argenteuil”, the second at the base of the “Calcaires de Sannois” and the last one at the base of the “Marnes à Huîtres”.

The isotopic records are comparable to those obtained from the pelagic sediments and the planktonic and benthic foraminifera for the same time interval. The $\delta^{18}\text{O}$ fluctuations are partly controlled by climate variations (step cooling) at the global scale. Stratigraphic correlations of the studied section with the oceanic realm can be established. The three positive $\delta^{18}\text{O}$ peaks may correlate with the main isotopic events **EOT1 and 2** and **OI1** (Katz *et al.*, 2008). They may also correspond to environmental changes such as hydrological changes. The Eocene - Oligocene boundary would be stratigraphically placed near the boundary between the “Marnes bleues d'Argenteuil” and the “Marnes blanches de Pantin” and therefore is lower than previously established (base of the “Glaises à Cyrènes”). This new proposal would be consistent with important environmental and paleontological changes observed at the transition between these two sedimentary formations.

Keywords: EOT, Priabonian, Rupelian, stable isotopes, step cooling

References: FONTES J.Ch. et LETOLLE R. (1976) - ^{18}O and ^{34}S in the Upper Bartonian gypsum deposits of the Paris Basin. *Chemical Geology*, 18, 285-295. KATZ M.E. *et al.* (2008) – Stepwise transition from the Eocene greenhouse to the Oligocene icehouse. *Nature Geoscience*, 1, 329-334.