

EGU22-10011

<https://doi.org/10.5194/egusphere-egu22-10011>

EGU General Assembly 2022

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Is there an orbital control on the pacing of anoxia across the Aptian-Albian boundary (~113 Ma)?

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The stratigraphic interval spanning the Aptian-Albian transition is marked by a cluster of short-lived marine anoxic episodes referred to as Oceanic Anoxic Event 1b (OAE 1b). These short-lived episodes are, from the oldest to the youngest, the Jacob, Kilian, Paquier and Leenhardt events. We here aim at testing the impact of the long Milankovitch cycles (1.2-Myr and 2.4-Myr) on the recurrence of these oxygen-deficiency episodes by establishing a precise astrochronology of the OAE 1b interval from the Col de Pré-Guittard section (Albian GSSP, Vocontian Basin, SE France). The section belongs to the "Marnes Bleues Formation", which is a thick (several hundred metres) clayey formation, interrupted by thin limestone beds and black shale layers, slumps and turbidites, all deposited in the hemipelagic part of the Vocontian Basin. Organic-matter carbon isotope ratios and Total Organic Carbon have been measured to precisely locate these events within the Col de Pré-Guittard section. A magnetic susceptibility signal was obtained from 3500 bulk rock samples collected every 5 cm. The sampling was performed on two parts of the Col de Pré-Guittard section to avoid a multi-decametric slump outcropping in one of the two section below the Kilian Level. However, two thin turbidite layers, near the Jacob and the Paquier events, remained unavoidable. Spectral analyses were performed using the Multi-Taper Method and the evolutive Fourier Transforms. These spectral analyses show the pervasive control of the 100-kyr eccentricity cycle and demonstrates a duration of (i) 1.6 Myr from the Jacob to the Kilian events, (ii) 1.5 Myr from the Kilian to the Paquier events, and (iii) 1.0 Myr from the Paquier to the Leenhardt events. Duration do not correspond to long Milankovitch cycles and thus do not favour the sole orbital control on the pacing of the anoxic events of the Aptian-Albian transition. Thus, other global forcing factors, as the volcanism, or local factors, as basin-scale paleoceanographic and climatic changes, have to be considered to explain this recurrence of anoxic conditions in the Vocontian Basin.