

## **Precession-driven monsoonal activity controlled the development of the early Albian Paquier oceanic anoxic event (OAE1b): Evidence from the Vocontian Basin, SE France**

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In the Vocontian Basin in southeastern France, the Aptian-Albian boundary is marked by the occurrence of four laminated black shales (Jacob, Kilian, Paquier, Leenhardt) corresponding to Oceanic Anoxic Event 1b (OAE1b). Here, we performed an integrated multi-proxy high-resolution study on the section at l'Arboudeysse in the northwestern part of the Vocontian Basin including mineralogical (whole rock and clay minerals) and geochemical (carbon and oxygen isotopes, organic matter, major and trace elements, mercury contents) analyses. The aim of this study is to reconstruct the level of productivity and related state of oxygenation, in addition to the weathering conditions on the adjacent continent during the Paquier event. Modest enrichments in redox-sensitive trace elements (RSTE; Mo, As, V, U, Ni) associated with moderate total organic carbon contents (between 0.57 and 5.52 wt. %) indicate the development of suboxic/anoxic conditions during deposition of the Paquier level. The strong enrichment of Mo (10-229) relative to other RSTE (<5) may be explained by the importance of a particulate Fe-Mn oxyhydroxide shuttle. The high phosphorus (P) contents are related to the presence of fish remains. The weathering and detrital indices estimated from clay and whole-rock mineralogy suggests temporal fluctuations in weathering conditions and detrital input, likely resulting from variable humid conditions. These variations display a cyclic pattern linked to Milankovitch precession cycles varying from humid, high weathering conditions, causing oxygen-depletion in the bottom water to dryer, low weathering conditions associated with less oxygen depleted bottom waters. This oscillation was probably controlled by changes in evaporation/precipitation patterns related to variably intense monsoonal activity. A lack of significant mercury enrichments is not supportive of a direct link between volcanic activity and environmental change during the Paquier event.

**Keywords:** weathering conditions; redox conditions; mercury; geochemistry; phosphorus.