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Climatic and geodynamic control of middle/upper Jurassic Clayey sedimentation from North–Western Tethysian domains

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Recent clay mineralogical investigations performed on Callovian–Oxfordian clayey deposits recovered in boreholes and outcrops from the north–eastern part of the Paris Basin have shown a major change of clay sedimentation. The mineralogical change is recorded during the Lower Oxfordian in the whole anglo–parisian basin as well, despite minor diachronism mainly explained by tectonic rejuvenations of continental borders. Disappearance of kaolinite balanced by abundant smectite minerals coincides with a severe global cooling, identified using isotopic and palynological analyses and from faunal migrations. New clay minerals data are presented for the Callovian–Kimmeridgian interval from both the north–eastern part of the Paris Basin and from the Hebrides domain. Oxygen isotopic variations measured on oyster shells coincide systematically with significant terrigenous fluctuations. Periods of kaolinite disappearance are coeval with $\delta^{18}O$ maxima, therefore suggesting a climatic control on the clay sedimentation. Clay minerals (kaolinite/smectite ratio) thus constitute an interesting paleoclimate proxy for the Jurassic, notably for humidity/aridity conditions.

In addition, we identified several bentonites (altered ash–fall layers) in the Hebrides and the Paris Basin, which attest that explosive volcanism associated with the North Atlantic rifting was particularly active during that period.