

## The marine geochemical record of the OAE 2 (~94 Ma) at high latitude: Example of the IODP Site U1516 (Exp. 369; Mentelle Basin, SW Australia)

Laurent Riquier<sup>1\*</sup>, Julien Danzelle<sup>1</sup>, Matthew M. Jones<sup>2</sup>, Christophe Thomazo<sup>3</sup>, François Baudin<sup>1</sup>

1 – UMR 7193 IStEP, Sorbonne Université, France

2 – Earth & Environmental Sciences, University of Michigan, USA

3 – UMR 6282 Biogéosciences, Université de Bourgogne-Franche Comté, France

The Oceanic Anoxic Event 2 (or OAE2), recorded at the Cenomanian-Turonian boundary (CTB; ~94 Ma), is characterized in several oceanic domains by the deposition of black organic-rich levels, usually termed as *black shales*, and is detected globally by a positive  $\delta^{13}\text{C}$  anomaly of around 3.5‰ in both organic and inorganic fractions. OAE2 has been particularly well studied in the Northern Hemisphere, as in the Central Atlantic Ocean or in Tethyan domain, where this event corresponds to the development of dysoxic to euxinic conditions, likely as a consequence of (1) an increase of nutrient inputs from volcanic activity or enhanced continental weathering and (2) partial restriction of water masses.

In contrast, the OAE2 is less well documented in the Southern Hemisphere, as in the Indian Ocean, where only few sites record the CTB. The impact on environmental parameters from this event is thus still debated in this area. Consequently, the nearly complete sedimentary sequence of the CTB obtained at Site U1516 during the IODP Expedition 369 in the Mentelle Basin (SW Australia) represents a unique opportunity to better understand the OAE2 in the Southern high latitudes.

For this site, the CTB is marked by a 3.5m thick carbonate-barren interval, encompassing 3 thin black levels with TOC values reaching up to 12.5%. New trace element data exhibit high concentrations of redox-sensitive elements (Mo, U, V) in these TOC-rich levels, highlighting dysoxic conditions in the Mentelle basin during OAE2. Conversely, elements linked to primary productivity (Si, P, Ba) show no noticeable enrichments above pre-OAE2 concentrations. Thus, elevated local primary productivity does not seem to be a triggering factor for the presence of black shales in this basin. Lastly, a sharp decrease in initial osmium isotope ratio ( $\text{Os}_i$ ) within the carbonate barren interval is interpreted as an evidence for ocean acidification associated with large igneous province volcanism during OAE2.

**Mots-Clés :** OAE2, Indian Ocean, TOC, TME, Cretaceous