



## **Carbonate factory changes in the Central High Atlas Basin (Morocco) associated with the Sinemurian-Pliensbachian Boundary event.**

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Several environmental perturbation events took place during the Early Jurassic. One of them, the Sinemurian-Pliensbachian Boundary event (SPBE), is particularly enigmatic, although it has received renewed attention in the last years. Its main characteristic is a negative carbon isotope excursion (CIE) of  $\sim 2\%$  measured in both fossil carbonate and continental organic matter. The European sections, in which this event has been recognised for the first time, show also a large and rapid transgression marked by condensation and decrease of carbonate content. This has led several studies to the conclusion of a carbonate factory demise caused by the rising sea level and associated environmental perturbation. In this study, we show that this picture is not uniform throughout the Tethyan realm by presenting a case study from the southern rim of the Tethys.

Our data comprise sections from subtropical paleo-latitudes now located in the Central High Atlas of Morocco and show shallow warm-water carbonates dated from the late Sinemurian to early Pliensbachian ages. The Upper Sinemurian is characterised by supratidal deposits with microbially dominated limestones, dolostones and tepee structures followed by a red interval with continental deposits such as clay- and siltstones with calcrete. This is followed by a rapid transgression and the introduction of a vigorous carbonate factory dominated by large bivalves (Lithiotids and megalodontids), gastropods, oncoids and ooids. Within the frame of the study, we present newly acquired  $\delta^{13}\text{C}_{\text{org}}$  data from two sections, which are already well dated via ammonite biostratigraphy. These provide the chemostratigraphic foundation on which the dating of the other sections is based on. The reference data clearly show the amplitude and duration of the CIE associated with the SPBE and prove its comparability to European data sets. These biostratigraphic and chemostratigraphic evidences highlight that the Sinemurian-Pliensbachian boundary occurs in this interval. Hence, the appearance of this thriving skeletally dominated carbonate factory is coeval with the boundary event, marking a striking difference in terms of carbonate factory development with most European sections.

The pronounced difference of how the carbonate factories in Europe and in the High Atlas Basin responded to the environmental changes in association with the SPBE raises questions about the features, dynamics and causes of this event. Hence, further research is needed to shine light onto this matter.