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Significant changes in runoff across the C/T boundary (OAE2) deduced from mineralogical and palaeontological data (Levant carbonate platform, Jordan)

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A marked δ^{13}C excursion combined with increased values in TOC characterise the Cenomanian-Turonian boundary event (CTBE) of the Levant carbonate platform in Central Jordan. The event can be well correlated to the global record. In the present study we analyse the total mineralogy across the CTBE in order to characterise changes in the mineral assemblage linked to processes like weathering, rainfall, current-induced sorting and volcanic mineral input. These data are combined with palaeoecological information (salinity, oxygen availability, biomarkers) giving insight into events of peak runoff probably involved in triggering OAE2.

The section investigated is positioned within a shallow intra-platform basin sensitive to record processes at the land-sea interface. In general a sequence of decreased carbonate production is observed starting at the mid Cenomanian event (MCE) and continuing to the end of the lower Turonian. An 87 m thick sequence of green-brown marls and clays with layers of nodular limestone is exposed including a short period of normal carbonate production in the lower late Cenomanian.

Data reveal an event of enrichment in heavy minerals and strongly fluctuating salinity including brackish conditions and episodes of evaporation that preceded OAE2. This indicates the presence of massive fresh water input events i.e. peaks in terrestrial input. This broad interval is as thick as the isotope excursion that follows it. Apparently, this period of time well before OAE2 served as a nutrient injection (spanning a similar duration as the isotope event itself) setting the prerequisites for a massive eutrophication during the later transgression that finally triggered the OAE. During OAE2

peaks in detrital mineral input are found to be consequently linked to the peaks in TOC. This supports the hypothesis of runoff-controlled productivity events. Furthermore, chlorite and kaolinite typically indicating humid weathering conditions show a broad abundance peak during OAE2. This points at a substantial climate shift (wetter conditions) paralleling the event at the palaeogeographic position investigated.