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Record of palaeoenvironmental changes in the Mid-Polish Basin during the Valanginian Event

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The Valanginian stage displays the first major perturbation of the carbon cycle of the Cretaceous period. The Valanginian Weissert episode is associated with a positive excursion (CIE) in $\delta 13C_{carb}$ and $\delta 13C_{org}$ values, and the occurrence of a crisis in pelagic and neritic carbonate production (Weissert et al., 1998; Erba, 2004, Föllmi et al., 2007). As for Cretaceous oceanic anoxic events (OAEs), the carbon anomaly is explained by the intensification of continental biogeochemical weathering triggering an increase in marine primary productivity and organic-matter preservation. However, to the contrary of OAEs, the organic matter trapped in the Tethyan Ocean during the Valanginian is both marine and continental and the occurrence of a widespread anoxia could not be evidenced (Westermann et al., 2010; Kujau et al., 2012). The resulting marine Corg burial rates were probably not sufficient to explain the shift in δ13C values and an alternative scheme has been proposed by Westermann et al. (2010): the carbonate platform crisis combined with the storage of organic-matter on the continent may be the major triggers of the δ13C positive shift. (Westermann et al., 2010). We present the results of an analysis of the Wąwał drilling core (Mid-Polish Trough), which is of particular interest because of its near-coastal setting and its exceptional preservation, demonstrated by the presence of up to 17 wt.% aragonite. The section consists in marine silty to sandy clays deposited on top of a lower Berriasian karstified limestone. It covers the Early and early Late Valanginian, and displays the onset of the positive excursion. The lack of anoxia is evidenced by trace-element and Rock-Eval data. Two intervals of phosphogenesis are emphasised that appear equivalent in time to the condensed horizons of the northern Tethyan region (Helvetic Alps). A rapid climate change toward less humid and seasonally-contrasted conditions that is similar to the northern Tethyan areas is observed closed to the early-late Valanginian boundary. This is associated to a decoupling of the $\delta 13C_{carb}$ and $\delta 13C_{org}$, which is interpreted as a change in atmospheric pCO_2.

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