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# Sea surface temperature development during the Early Aptian Oceanic Anoxic Event 1a at ODP Site 641C Galicia Margin, tropical Atlantic

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The most prominent example for rapid climate change related to the release of $CO_2$ from gas hydrates in the Cretaceous is thought to be represented by an abrupt and stepped negative carbon-isotope excursion at the base of the Early Aptian Oceanic Anoxic Event 1a (OAE 1a, Selli- or Niveau Goguel-Event). To reconstruct the chain of processes affecting the Early Aptian land-ocean-atmosphere system in tropical regions of the Atlantic we started to investigate ODP Site 641C from theGalicia Margin for sea surface temperatures ($TEX_{86}$), organic carbon composition and burial, bulk carbon and oxygen isotopes, and inorganic markers for productivity, ocean redox and continental supply.

Bulk carbon isotope data from carbonates and organic matter clearly identify the onset of OAE 1a by a marked negative $\delta^{13}C$ shift of 1.25‰ associated with a pronounced increase in TOC from 0.5 to more than 2%. The diagnostic initial negative isotope excursion is followed by a sudden drop in carbonate content from more than 40% to close to zero and a 3‰ increase in $\delta^{13}C_{carb}$. $TEX_{86}$-SST estimates indicate temperatures far in access of 30˚C. The SST record shows fairly constant temperatures before and after the event. During OAE 1a SSTs increase markedly by up to 4˚C. Elevated Ba/Al and Si/Al ratios suggest overall high bioproductivity that commenced before the onset of the event. The relationships between TOC-Fe-S support normal marine conditions for most of the studied interval except for the termination of the event where stronger oxygen depletion is indicated. Redox-sensitive element ratios fluctuate and are only moderately enriched compared to average shale values supporting variable but at times anoxic bottom water oxygenation levels.

Associated climate effects are inferred from inorganic proxy data. A minimum in Mg/Al and Na/Al and high CIA (chemical index of alteration) values during the event suggest preferential contribution of more aluminum-rich clay minerals (e.g. kaolinite) and hence more intense and humid weathering conditions in the Iberian source area. Decreasing amplitudes of the Mg/Al, K/Al and Na/Al records from the onset of OAE 1a argue for a reorganization towards less variable and less humid climate conditions.