Drivers of euxinia during the Toarcian Oceanic Anoxic Event

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Euxinic conditions extending into the photic zone of the water column, termed photic zone euxinia (PZE), are a hallmark of Oceanic Anoxic Events (OAEs) and are assumed to have been a key mechanism driving extinction events in Earth history. Evidence for PZE in ancient environments comes from the occurrence of fossilized lipids diagnostic for photoautotrophic sulfur bacteria (e.g. *Chlorobi*). During the Toarcian OAE (Early Jurassic) the presence of *Chlorobi*-derived lipids suggest that PZE was widespread in shelf environments. The duration, persistence and spatial extent of PZE, as well as mechanisms controlling *Chlorobi* blooms are, however, poorly constrained. Here, we present a data set comprising trace elements, iron speciation, molybdenum isotope and lipid biomarker data, for a sediment core that spans the Toarican OAE (early Jurassic). The application of multiple geochemical techniques allows us to decrypt the various factors controlling shelf sea oxygenation and PZE. Euxinic conditions prevailed during the climax of the OAE (C-cycle perturbation inteval) and were promoted by a high sea level and were stabilized persistent density stratification. However, low abundances of *Chlorobi*-derived lipids indicate that H_2S was either limited to the aphotic zone or PZE was episodic. On the contrary, *Chlorobi* blooms occurred most frequently during the post OAE interval, where redox conditions were more fluctuating, but basinal restrinction reached it's maximum degree. The divergent evolution of redox indicators highlight the complexity of processes controlling bottom water deoxygnation and expansion of euxinic conditions in the photic zone.