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Palaeoenvironmental impacts on changes in bottom water oxygen availability at OAE 2

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Phosphorus (P) accumulation rates provide evidence of nutrient regeneration during the late Cenomanian oceanic anoxic event (OAE 2) in four geographic localities whose sediments were deposited under paleoenvironmental regimes (Pueblo, Colorado, USA; Eastbourne, UK; Furlo, Italy, Manilva, Spain). At each locality, accumulation rates of phosphorus bound to iron oxyhydroxides, authigenic apatite and organic matter increase during the positive δ13C excursion and return to pre-excursion values shortly after the first isotope peak. Subsequent to this, total organic carbon (TOC) and Hydrogen Index (HI) data display a positively correlated increase in values, suggesting that in the later stages of OAE 2, organic carbon accumulation was strongly linked to preservation under increasingly dysoxic conditions. Both the reduction in P MARs and the clear relationship between TOC and HI values, suggest that lower oxygen availability lead to a decrease in P burial efficiency (PBE). δ13C values remain at a relatively high plateau. Large positive increases in the Corg/Preactive molar ratios at the onset of high organic matter accumulation and drops in P MARs both suggest the presence of O_2 depleted bottom waters, which facilitated the processes of nutrient regeneration, which in turn sustained elevated primary productivity and the δ13C plateau.