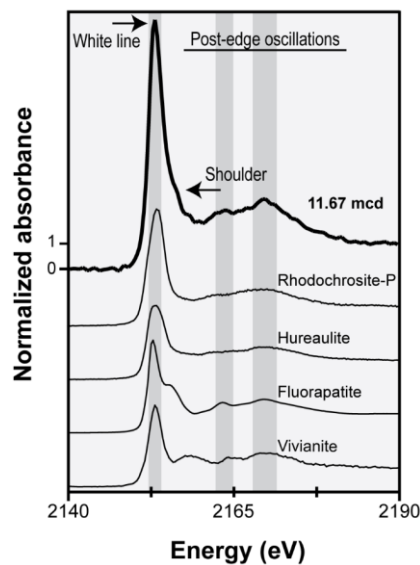
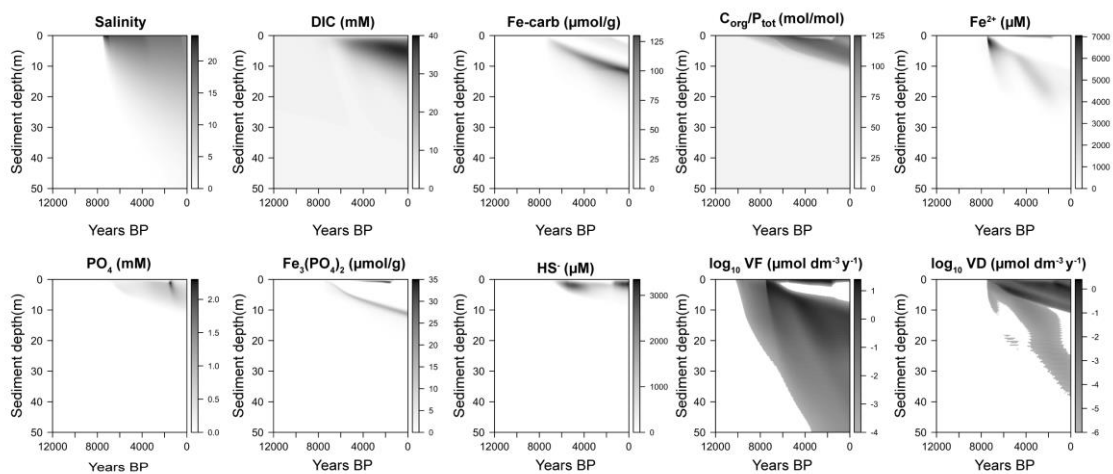


Supplement:



**Figure 7:** Unfocused P-XANES spectra of bulk sediment from 11.67 mcd (Hole C) and various standards. All standards are described in Dijkstra et al. (2016). The dark grey shading highlights areas of specific interest. The positions of main features of the bulk sediment spectrum (the white line, post-edge shoulder and the post-edge oscillations) are indicated in the figure. The white line (main absorption step) is observed in all P spectra, whereas the shoulder features are only visible in the bulk sediment spectrum and the fluorapatite spectrum.



**Figure 11:** Modeled evolution of salinity, dissolved inorganic carbon (DIC), Fe-carbonates (Fe-carb),  $C_{org}/P_{tot}$ , dissolved Fe ( $Fe^{2+}$ ), phosphate ( $PO_4$ ), vivianite ( $Fe_3(PO_4)_2$ ), dissolved sulfide ( $HS^-$ ) and rates of vivianite formation (VF) and vivianite dissolution (VD) in the Bornholm basin sediments from 12000 BP to present. A white color in the plots of VF and VD indicates values below the scale bar minimum. The increase in salinity at 7500 BP marks the onset of the lake-marine transition. The subsequent deposition of sediment in a brackish-marine environment and the related changes in the porewater chemistry led to major changes in solid phase chemistry as a function of sediment depth and time. The distinct bands of Fe-carbonate and vivianite ( $Fe_3(PO_4)_2$ ) minerals formed in the sediments are particularly striking.