

## Description of Additional Supplementary Files

**File name:** Supplementary Data 1

**File description:** Reference list of existing porewater sulphate and sulphide  $\delta^{34}\text{S}$ - $\Delta^{33}\text{S}$  (fig. 3A).

**File name:** Supplementary Data 2

**File description:** Reference list of porewater chemistry collected in marine sediments (fig. S6).

**File name:** Supplementary Data 3

**File description:** Matlab™ code of pyrite formation and Fe isotope fractionation model.