Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03736, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03736
EGU General Assembly 2008
© Author(s) 2008

A regional negative carbon-isotope excursion at the Pliensbachian-Toarcian boundary

K. Littler (1), S. P. Hesselbo (2), H. C. Jenkyns (2)

(1) Department of Earth Sciences, University College London, England, (2) Department of Earth Sciences, Oxford University, England. (kate.littler@ucl.ac.uk)

A regionally synchronous perturbation in the carbon-isotope record at the time of the Pliensbachian–Toarcian boundary ($\sim$184ma) in the Early Jurassic is reported, based on new data from Yorkshire, England. Two sharp $\delta^{13}C_{org}$ negative excursions, each with a magnitude of $\sim$ -2.5 per mil and reaching minimum values of -28.5 per mil are seen in the bulk organic-matter record at this level. The predominantly argillaceous section at Hawsker Bottoms, Yorkshire has been the site of several previous studies into Jurassic palaeoceanography, due to its excellent coastal exposure and well-constrained biostratigraphy. The isotopic event can be correlated with a similar magnitude negative carbon-isotope excursion seen at the stage boundary in the Tethyan section at Peniche, Portugal in $\delta^{13}C_{carbonate,}\delta^{13}C_{wood}and\delta^{13}C_{brachiopod}$records. Such an event is of interest when considering the genesis and development of the later Toarcian Oceanic Anoxic Event (OAE), as well as the second-order global extinction event, which spans the stage boundary and extends into the lower Toarcian. An isotope event that can be correlated regionally could also provide a useful chemostratigraphic marker for the stage boundary, which is currently defined on the basis of different ammonite biozones in the Boreal and Tethyan realms. We also present supplementary $\delta^{18}O$, Mg/Ca and Sr/Ca data obtained from belemnites collected with the bulk sediment samples from Yorkshire, and these can tentatively be interpreted in terms of changes in palaeotemperature. Such an interpretation would suggest a cooling trend in the northwest European epicontinental shelf region during latest Pliensbachian to earliest Toarcian time before warming during the subsequent OAE.