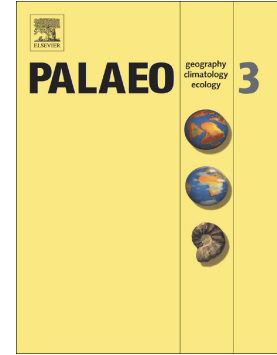


Accepted Manuscript

High frequency fluctuations in redox conditions during the Late Permian extinction event

C. Mettam, A.L. Zerkle, M.W. Claire, G. Izon, C.J. Junium, R.J. Twitchett



PII: S0031-0182(17)30210-9
DOI: doi: [10.1016/j.palaeo.2017.06.014](https://doi.org/10.1016/j.palaeo.2017.06.014)
Reference: PALAEO 8330

To appear in: *Palaeogeography, Palaeoclimatology, Palaeoecology*

Received date: 24 February 2017
Revised date: 13 June 2017
Accepted date: 14 June 2017

Please cite this article as: C. Mettam, A.L. Zerkle, M.W. Claire, G. Izon, C.J. Junium, R.J. Twitchett, High frequency fluctuations in redox conditions during the Late Permian extinction event, *Palaeogeography, Palaeoclimatology, Palaeoecology* (2017), doi: [10.1016/j.palaeo.2017.06.014](https://doi.org/10.1016/j.palaeo.2017.06.014)

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

High frequency fluctuations in redox conditions during the Late Permian extinction event

Mettam, C. *¹, Zerkle, A.L.¹, Claire, M.W.¹, Izon, G.^{1,2}, Junium, C.J.,³, Twitchett, R.J.⁴

¹School of Earth and Environmental Science, and Centre for Exoplanet Science, University of St Andrews, KY16 9AL, UK* Correspondence: cwm2@st-andrews.ac.uk

²Current address: Dept of Earth, Atmospheric & Planetary Sciences, Massachusetts Institute of Technology, Cambridge, MA 02139, USA

³Dept. of Earth Science, Syracuse University, NY, 13244-1070, USA

⁴Dept. of Earth Science, Natural History Museum, London, SW7 5BD, UK

ABSTRACT

New high-resolution geochemical and sedimentological data from Fiskegrav, East Greenland, reveal fluctuations in marine conditions associated with the final disappearance of bioturbating organisms during the Late Permian extinction. Sedimentological observations imply a transgressive episode and the associated geochemical evidence for decreasing oxygen availability and the establishment of persistently ferruginous (Fe²⁺-rich) conditions implies the shoreward migration of an oxygen minimum zone (OMZ). The long-term decline in dissolved oxygen (DO) availability could have been exacerbated by increased delivery of nutrients to the marine shelf by terrestrial runoff, stimulating biological oxygen demand (BOD), and sea floor oxygen deficiency may have been exacerbated by water column stratification resulting from salinity contrasts and high surface sea water temperatures. During the transition to persistently ferruginous conditions we identify intervals of intermittent benthic meiofaunal recolonisation, events that we attribute to small transient increases in DO availability. The mechanism controlling these fluctuations remains speculative, but given the apparent millennial-scale frequency of these changes, we hypothesise that the mid-latitude setting of Fiskegrav during the Late Permian was sensitive to changes in atmospheric circulation patterns, which may have influenced local precipitation on such time scales and thus intermittently modulated some of the processes reducing DO availability.

Keywords

Permian extinction; Marine redox; Fe speciation; East Greenland; Stable isotopes

Highlights

- Water column anoxia associated with disappearance of bioturbators
- Fluctuating redox conditions during transition from oxic and anoxic conditions
- Changes linked to local factors including transgression and weather patterns

Download English Version:

<https://daneshyari.com/en/article/8868645>

Download Persian Version:

<https://daneshyari.com/article/8868645>

[Daneshyari.com](https://daneshyari.com)