



Paleoceanographic significance of red-stained sedimentary intervals in a Pennsylvanian high-rising carbonate platform

B. van der Kooij (1), A. Immenhauser (1), T. Steuber (2), E. Samankassou (3), J. R. Bahamonde (4), M. Hagmaier (2), O. Merino Tomé (5)

(1) Vrije Universiteit Amsterdam, The Netherlands, (2) Ruhr Universität Bochum, Germany, (3) University of Fribourg, Switzerland, (4) Universidad de Oviedo, Spain, (5) Universidad de Salamanca, Spain (koob@geo.vu.nl / Fax: +31-20-5989144 / Phone: +31-20-5987352)

Open marine, red-stained carbonate bodies occur throughout the geological history (e.g. the Belgian Devonian bioherms, the Alpine Ammonitico Rosso etc.). Their depositional environments and the mechanisms that cause the red staining vary from the shallow marine to the (hemi) pelagic domains. In general, however, many fundamental questions regarding the paleoceanographic and environmental significance of red marine intervals remain unsolved.

The well-exposed Sierra del Cuera high-rising carbonate platform (Pennsylvanian) in Northern Spain provides an opportunity to study red-stained intervals in different physiographic zones of a carbonate platform. On the platform top, these intervals are interbedded with normal marine facies and occur as lenses to beds, A few meters thick and tens of meters to over 1 kilometer long, rich in crinoid fragments and other bioclasts. On the upper slope, dominated by microbial boundstone, red-stained intervals consist of brachiopod, bryozoan and crinoid-rich layers with a red-stained matrix and biocementstone facies. On the lower slope and toe-of-slope, the red intervals are present as breccias with boundstone lithoclasts in a red-stained matrix.

In order to better understand the origin of red layers and their paleoceanographic significance, sedimentological data, facies analysis and sequence stratigraphy, trace elemental and stable isotope geochemistry, both on the platform and slope have been performed and first results are presented in this talk. The results obtained so far indicate that the red-layer intervals point to paleoceanographic conditions that deviate

from normal platform and slope sedimentation. In terms of sequence stratigraphy, red layers can be interpreted as maximum flooding intervals respectively periods of abnormally high (relative) sea level. This is confirmed by the presence of high volumes of crinoid hash in platform-top red intervals – in Paleozoic settings commonly an indication for transgressive periods. Red-layer stable-isotope data deviate from values of background sediment. A tentative first interpretation points to upwelling of cold, nutrient rich bottom water.

More detailed work focusing on the origin and the mechanisms that cause the deposition of such red intervals, their architecture and their paleoceanographic significance will shed light on processes active in coastal marine settings during periods of rapid sea-level rise and bottom water upwelling.

This is a contribution to EUROMARGINS project ESF 01-LEC-EMA11F