Geophysical Research Abstracts
Vol. 13, EGU2011-8527-1, 2011
EGU General Assembly 2011

High-resolution stratigraphy and faunal associations in the Upper Sinemurian organic-rich deposits of the western Iberian margin (Lusitanian Basin, Portugal)

Luís V. Duarte (1), María J. Comas-Rengifo (2), Ricardo Paredes (1), M. Cristina Cabral (3), Ricardo L. Silva (1), and Ana C. Azerêdo (3)

(1) Universidade de Coimbra, Departamento de Ciências da Terra and IMAR-CMA, Faculdade de Ciências e Tecnologia, Coimbra, Portugal (lduarte@dct.uc.pt; r.filipae@gmail.com; ricardo.silva@student.dct.uc.pt), (2) Universidad Complutense de Madrid, Departamento-UEI de Paleontología, Facultad de Ciencias Geológicas, Madrid, España (mjcomas@geo.ucm.es), (3) Universidade de Lisboa, Departamento de Geologia and Centro de Geologia, Faculdade de Ciências, Lisboa, Portugal (mccabral@fc.ul.pt; acazeredo@fc.ul.pt)

The Upper Sinemurian of the Lusitanian Basin (Portugal) is represented by marl-limestone alternations with black shales. These organic-rich deposits are particularly well developed in the western part of the basin, corresponding to the Polvoeira Member of the Água de Madeiros Formation (Duarte *et al*., 2010). Based on a high-resolution stratigraphical study of this unit in the reference sections of S. Pedro de Moel region, a multidisciplinary study involving sedimentology, geochemistry (total organic carbon: TOC) and invertebrate fauna (ammonites, brachiopods, bivalves and ostracods) analysis is presented in this work.

The approximately 42 m thick organic-rich studied succession is dated from the Oxynotum to the top of Raricostatum ammonite zones. Black shales occur in the whole succession being associated with more argillaceous sediments in the upper part of the unit. The TOC, analyzed in 129 horizons, shows a large variation, reaching the maximum value of 22% at the top of the Oxynotum Zone. More than 60% of the studied samples present TOC content above 3%. In these cases, lithofacies correspond to dark-grey marls, sometimes exhibiting a marked microlamination.

Despite the apparent uniform distribution of the organic-rich facies across the section, the fauna record shows a marked differentiation. In black fissile organic-rich shales, TOC is generally above 6%, and benthonic macrofauna and ostracods are absent. However, the lower part of the succession (Oxynotum Zone), clearly more calcareous, contains a large abundance and diversity of brachiopods (e.g. *Lobothyris, Zeilleria, Cincta, Piarorhynchia*, *Tetrarhynchia, Spiriferina*), infaunal (*Pholadomya*) and epifaunal bivalves (dominated by *Gryphaea*), and ostracods in a few rare levels (e.g. *Ogmoconchella*, *Polycope*, *Cytherelloidea*, *Cardobairdia*). With the exception of some rhynchonellids (e.g. *Piarorhynchia*, *Tetrarhynchia*) and a few sporadic disarticulated bivalves, these assemblages basically disappear in the middle-upper part of the unit (Raricostatum Zone), being replaced by different species of *Oxytomidae* and *Pectinidae* and by nektonic fauna, such as ammonites and belemnites. Actually, Oxynoticeratids and Echioceratids are particularly abundant in some horizons and allow the recognition of the four standard subzones of the Raricostatum Zone.

Our data suggest that the occurrence of these organic-rich deposits is linked with cyclic oxygen depletion at the sea floor. All the sedimentary arguments, including the lateral correlation with other sections, confirm the Aplanatum Subzone as the time interval correlative with the deepest sedimentation episode in the whole Sinemurian of the Lusitanian Basin.

Duarte, L.V., Silva, R.L., Oliveira, L.C.V., Comas-Rengifo, M.J. & Silva, F. (2010) – Organic-rich facies in the Sinemurian and Pliensbachian of the Lusitanian Basin, Portugal: Total Organic Carbon and relation to transgressive-regressive facies cycles. Geologica Acta 8 (3), 325-340.