Geophysical Research Abstracts,
Vol. 11, EGU2009-5721, 2009
EGU General Assembly 2009

Significance of nodule formation for the interpretation of matrix micrite C and O isotope ratios in Upper Jurassic Ammonitico Rosso limestones (Betic Cordillera, SE Spain)

R. Coimbra (1), A. Immenhauser (2), and F. Olóriz (1)

(1) University of Granada, Stratigraphy and Paleontology, Granada, Spain (rcoimbra@ugr.es), (2) University of Bochum, Institut for Geology, Mineralogy and Geophysics

Three Ammonitico Rosso (AR) sections from the Betic Cordillera in SE Spain were analysed to obtain stable isotope records and access paleoenvironmental information. The study area corresponded to a Late Jurassic distal epioceanic setting and is characterized by the occurrence of more or less calcareous AR horizons ranging from greyish to redish colour. The carbonate materials under scope where retrieved from the Cardador, Salcedo and Cañada del Hornillo sections and consist on matrix micrite, carbonate cements and skeletals and were analysed for their carbon and oxygen isotope signature. At least one bulk sample per ammonite biozone was retrieved under a strict biochronostratigraphic control. The degree of diagenetic imprint was acessed by cathodoluminiscence analysis and carbonate ultrastructure was analysed by scanning electron microscope. Micrite matrix showed dull luminiscence, revealing a low degree of diagenetic overprint, as oposite to carbonate cements and skekeltal materials, that presented bright orange luminiscence. The identification of coccoliths and filaments under SEM attested for the good degree of preservation of the carbonate ultrastructure. The carbon isotope chemostratigraphy resembles the known trends for Jurassic northern Tethyan margins and absolute values (from 1.1 to 3.3 permil) are within the range usually reported for well preserved material. Oxygen isotopes of matrix micrite samples present higher values than those expected for Upper Jurassic materials (ranging from -0.3 to 0.9 permil for the Cardador and Salcedo sections and from -2.1 to 0.4 permil at the Cañada del Hornillo section), whilts commonly well preserved low-Mg calcite skeletal materials, such as belemenite rostra present lower values than matrix micrite, acompanied by a very bright orange luminiscence. In contrast to what is usually reported, matrix micrite presents values closer to what would be the original isotopic composition and skeletal material is more affected by latter diagenesis. In this context, paleoenvironmental considerations are available, and the oxygen curve is interpreted as reasonable approximation of seawater paleo-temperatures and relative depth. Very early marine nodule formation is thought to be determinant for the high isotope values found at these locations. It is proposed that early diagenetic nodule formation preserved near-seawater isotopic signals and inhibited subsequent diagenetic overprint as revealed by several proxies retrieved from intra-nodule samples.