Geophysical Research Abstracts
Vol. 17, EGU2015-10561-2, 2015
EGU General Assembly 2015

Microtaphofacies of Lower Jurassic Limestones from the Rotzo Formation, Northern Italy

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Microtaphofacies investigations allow for the study of taphonomic features of cemented limestones as found in thin sections. It allows for changes in environmental parameters to be assessed especially with respect to abrasion, fragmentation, encrustation and bioerosion of biotic components. Variations of taphonomic features along environmental gradients can thus be examined and can be compared to other facies determining features such as the distribution of specific biotic components as well as carbonate fabrics. The Lower Jurassic Rotzo Formation, occurring in the palaeogeographic unit Trento Platform (Southern Alps, Italy), is characterized by very well preserved components in a shallow water lagoonal setting. Components are dominated by dasycladalean algae, small and large benthic foraminifera, various bivalves, gastropods, brachiopods and echinoderms. Oncoids and trace fossils can also be prevalent. Although bioclastic components are commonly preserved in very fine micritic limestones, various types of mass occurrences are also present especially with respect to the bivalves including the well known Lithiotis fauna. Microfacies are dominated by mudstones. Bioclastic rich microfacies are also present with packstones and rudstones mainly containing foraminifera and bivalves, but also including, and in part dominated by other components.

Microtaphofacies were studied along the Monte Toraro section to the east of Tonezza del Cimone (Vicenza Province). Abrasion, fragmentation, bioerosion and encrustation were qualitatively and semi-quantitatively analyzed with features being scored into three categories equivalent to good, fair, and poor preservation. This allowed for changes along the section to be analyzed. Abrasion and fragmentation are common in all facies and affect most components. Encrustation and bioerosion rates, however, are highly variably are only dominate in oncoids rich facies. Components in mass shell accumulations are often very well preserved showing little taphonomic alterations. Diagenesis also plays an important role with aragonitic components being replaced by calcite. This study shows that the microtaphofacies analysis can expand and complement traditional thin section analysis and classification schemes. This is especially evident when analyzing those taphonomic features which can be interpreted with respect to transport and/or water agitation (abrasion/fragmentation) as well as those related to surface residence times (encrustation/bioerosion).