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Testing microtaphofacies as an analytic tool for integrated facies and sedimentological analysis using Lower Miocene mixed carbonate/siliciclastic sediments from the North Alpine Foreland Basin

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Taphonomic studies have mostly concentrated on the investigation and quantification of isolated macroscopic faunal and floral elements. Carbonate rocks, in contrary to isolated macroscopic objects, have rarely been specifically addressed in terms of taphonomic features, although many aspects of microfacies analyses are directly related to the preservation of constituent biogenic components. There is thus a high potential for analyzing and quantifying taphonomic features in carbonate rocks (microtaphofacies), not the least as an additional tool for facies analysis. Analyzing the role of taphonomy in carbonate environments can be used to determine how different skeletal architectures through time and evolving synecological relationships (bioerosion and encrustation) have influence carbonate environments and their preservation in the rock record.

This pilot study analyses the microtaphofacies of Lower Miocene, shallow water, mixed carbonate - siliciclastic environment from the North Alpine Foreland Basin (Molasse Sea) of southern Germany. The sediments range from biogenic bryomol carbonates to pure siliciclastics. This allows environmental interpretation to be made not only with respect to biogenic composition (dominated by bivalves, gastropods, bryozoans and barnacles), but also to siliciclastic grain characteristics and sedimentary features. Facies interpretation is relatively straight forward with a somewhat varied near shore facies distribution characterized dominated by carbonate which grade into higher energy, siliciclastic offshore sediments. Taphonomic features are assessed along this gradient with respect to total component composition as well as by following the trajectories of individual components types. The results are interpreted with respect to biogenic production, fragmentation, abrasion and transport.