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MIXED SILICICLASTIC/CARBONATE ENVIRONMENTS FROM THE CENOZOIC NORTH ALPINE FORELAND BASIN: POSSIBILITIES AND LIMITATIONS OF INTERPRETING COMPLEX EPI-CONTINENTAL SEDIMENTS (UPPER MARINE MOLASSE, EARLY MIOCENE)

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The Cenozoic, North Alpine Foreland Basin is characterized by large scale alternation of marine and non-marine conditions constituting the classic Molasse sedimentary sequence. This dramatic fluctuation of sedimentary regimes has been related to the complex interaction of tectonic uplift and erosion of the alpine chain to the south, the varied background geology of the stable European platform to the north, eustatic sea level changes and not the least, paleogeographic developments including the formation of the Paratethys Seaway.

The resulting marine sediments of the Upper Marine Molasse (OMM) are mostly dominated by siliciclastics, but also contain intriguing mixed siliciclastic/carbonate environments. Although carbonates are spatially and temporally isolated, the analysis of their biogenic constituents and facies relationships provides a wealth of paleoecological information in addition to the sedimentological data at hand.

This study is based on new detailed sedimentological and paleontological analysis of classic localities from the Lower Miocene, Upper Marine Molasse Zone from southwestern Germany. These localities include, among others, a mixed siliciclastic/carbonate environment with higher energy, cross-bedded sands and bryomol type carbonate sediments ("Randengrobkalk"), an isolated mass occurrence of turritellid gastropods ("Erminger Turritellenplatte") and tidal dominated sandwave deposits of various types ('Grobsandzug", "Baltringer Schichten" and "Heidenlöcher beds") indicating sub- to intertidal environments.

Paleontological data is juxtaposed to sedimentological criteria, and both are compared to large scale modelling of tidal and wave movement within the OMM sea, as well as to climatic reconstruction derived from both terrestrial and marine records from the Miocene of Europe. The possibilities and difficulties of applying actualistic sedimentary and facies models from recent epi-continental seas for interpretation is discussed, not the least with respect to the rapid changes in background tectonics setting, paleogeography, and climate which dictated sedimentation in the Molasse Sea during the Cenozoic.