THE LATE TRIASSIC HAUPTDOLOMITE SECTION WIESTALSTAUSEE NEAR HALLEIN (NORTHERN CALCAREOUS ALPS, AUSTRIA): BIOMARKER EVIDENCE FOR THE FORMATION OF ORGANIC-RICH SUCCESSIONS IN SMALL SCALE BASINS WITHIN CARBONATE PLATFORMS

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The origin of organic-bearing reducing sediments within the Late Triassic Hauptdolomite/Dachstein carbonate platform of the Northern Calcareous Alps, a subject of some debate, is clarified by microfacies biomarker analyses that enable the characterization of the depositional environment of the Norian dolomicrites (Hauptdolomite) of the Wiestalstausee section (Lower Tirolic nappe, Salzburg Calcareous Alps). By examining the section using the oxygen-restricted biofacies (ORB) classification, we find ORB 1-4 mostly in the dark grey organic- rich sediments and ORB 6, or normal oxygen conditions for the light grey dolomites. Anaerobic biofacies, characterized by the total absence of benthic organisms and a fissile sediment fabric, predominate for most of the dark grey and micritic parts of the section. The laminated dolomicrites show ORB 3 and ORB 4, containing very few benthic species, which are abundant on some bedding planes in ORB 4. Here, the sediment fabric is planar laminated, but limited bioturbation may occur. This sediment type corresponds to the poikiloaerobic and episodically dysaerobic facies.

The *n*-alkane distribution patterns and relative intensities of steranes are typical for organic matter of predominantly algal and/or microbial origin with minor contributions from land plants. Phytoplankton (including dinoflagellates) and photosynthetic bacteria are considered as the major primary producers of the biomass accumulated within the immature, carbonate-rich rocks. High contents of hopanoid biomarkers and constituents related to the arborane/fernane skeleton are considered to be of bacterial origin and indicate enhanced microbial activity in the sedimentary environment. However, a terrestrial origin (from land plants) of the arborane/fernane-derivatives cannot be excluded. The occurrence of aryl isoprenoids, probably derived from carotenoids of the photosynthetic green sulfur bacteria (*Chlorobiaceae*), indicates the establishment of euxinic conditions in the bottom water.

Comparable diagenetic degradation mechanisms led to the formation of hopanes and hop-17(21)-enes. Methylated chromans occur in low abundance, and the predominant occurrence of trimethylated C_{29} chroman (tri-MTTC) over dimethylated C_{28} chroman (di-MTTC) indicates enhanced salinity in the upper part of the water column. Diagenetic conversion of organic matter under anoxic conditions in a high-sulfur environment due to salinity stratification are further indicated by low Pr/Ph values and high contents of the C_{35} benzohopane compared to the C_{32} to C_{34} homologues. The relative proportions of S/R isomers of the $\alpha\alpha\alpha$ C_{29} steranes and the $\alpha\beta$ C_{31} hopanes are consistent with an organic matter maturity equivalent to vitrinite reflectance values of ~0.5% Rr. This maturity assessment is further confirmed by the predominance of monoaromatic over triaromatic steroids.

In the present study, the interaction of salinity variations, water column stratification, and the establishment of anoxic conditions within a restricted carbonate platform is highlighted using molecular indicators. For the first time, sedimentological and geochemical features provide evidence for the establishment of small-scale anoxic basins through erosion by currents or from the remnants of channels, which were possibly isolated periodically by small scale sea level changes. Changes in carbonate production also may play a role. Beside tectonically induced formation of anoxic basins in the Late Triassic carbonate platform (e.g., Seefeld basins), this mechanism may contribute to the enhancement of the hydrocarbon potential of the Hauptdolomite/Dachstein carbonate platform of the in the whole western Tethyan realm.