SOME BIOGEOCHEMICAL ASPECTS OF THE LATE NORIAN HALLSTATT LIMESTONES

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Strong tectonic pulses triggered by Late Triassic strike-slip motions destabilized the geometry on the Hallstatt margin, culminated in the late Middle Norian and decreased rapidly in the early Rhaetian. Variations in the morphology with deep fractures into the underlying sediment, ‘climatic cooling’ with significant shifts in stable carbon and oxygen isotopes, and eustatic pulses were coupled with changing palaeo-ocean environment proxies. Erosion of uplifted deeper continental crust-fragments in the hinterland resulted in intense remobilization of metals and rare earth elements. Lowered sediment accumulation rates, due to a decrease in the carbonate production caused in condensed environments and drove in the upper few centimetres of the hemipelagic biomicrites a shallow-burial diagenetic interaction between communities of symbiotic organism, fermentative decomposition of the organic matter, formation of authigenic biominerals, and an anaerobic oxidation of methane. In stratified layers, the increased abundance of biologically available elements and the selective uptake of (?metal and) lanthanide ions processed (?catalysed by bacteria) the replacement of calcium cations in the biomolecules of (some) deeper water organisms, which seemed to destabilize the equilibrium in the biological system and favoured most probably crystalline effects on the skeletal structures and morphogenic changes. These biochemical redox-reactions performed also low-temperature biogenic hydrate water releases, which appeared on the proximal shelf as cemented molds of burrows, or as local linings of fluid channels. The latest Alaunian to earliest Sevatian tectonic pulse destabilized the hydrates, drove the formation of volcanism, and support an ocean acidification in ‘silicifying’ the sediment on the distal continental shelf. Gradual climatic warming effected the transgression of the sea-level, and combined with a rapid subsidence, triggered these the sudden ‘recovery’ of the Early Sevatian Dachstein carbonate platform reef.