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Pronounced carbonate deposition in the Early Triassic Dienerian substage: Who was the carbonate producer?

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At the Late Permian Mass Extinction (LPME) most marine carbonate producers were heavily affected or even terminated. After the event in several sections a "boundary clay" was deposited and in the Griesbachian microbialites have been reported from many marine sections, however, without causing substantial thicknesses. The Dienerian in many Tethyan sections, though, is characterized by a huge increase in sedimentation rate due to the deposition of limestone mud with only minor amounts of siliciclastic input. This is in contrast to the still missing "usual" (skeletal) carbonate producers that have not yet re-appeared after the extinction, and also in contrast to a steeply and constantly rising marine Sr-isotope curve. To us this pattern indicates short timed intense post-extinction acidification in some areas causing a strong decrease of carbonate precipitation and thus resulting in the sedimentation of the boundary clay. Post-extinction low sedimentation rate supported the extensive growth of microbialites, thrombolites and stromatolites on seafloors in the photic zone, resulting in the photosynthetic uptake of bicarbonate ions which induced carbonate biomineralisation within the microbial mats probably during still prevailing acidic ocean condition. In the Dienerian the ocean water pH must have returned to non-acidic conditions again due to biotic and probably mainly microbial activity, resulting in a thriving and carbonate precipitating planctic microbial community producing huge amounts of microcrystalline carbonate mud. As some sections already in the Griesbachian feature substantial accumulations of carbonate mud layers, there acidification might have lasted only for a shorter period. Burial of the mainly microbial biomass probably also resulted in the positive 13C isotope curve trend from the Griesbachian to the Dienerian-Smithian boundary. Our interpretation identifies the (marine) microbial community as one of the important and THE biotic factor influencing and shaping the Early Triassic environment.