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Numerical Modeling of Middle Triassic Passive Continental Margin and Carbonate Platform Development in the Lombardian Alps (Italy)

An upper Permian to Upper Triassic succession with a thickness of up to 2000m is well exposed in the southern Camonica Valley of the Lombardian Alps (Italy). The clastic and carbonate sediments were formed on a passive continental margin, occasionally influenced by strong regional transtension. Several carbonate build-ups developed in the Middle Triassic, e.g. the Pora platform (Esino Fm.) in the late Ladinian. The rimmed platform has a thickness of up to 400m, a lateral extension of approximately 10 km and shows strong progradation of megabreccia clinoforms. The Pora platform covers the time interval between the Archelaus zone and the L/C boundary (top of Regoledanus zone).

Detailed basin analysis with reverse and forward modelling shows a complex pattern of differential subsidence. The platform geometry was controlled by an asynchronous development of accommodation space at the beginning of platform growth, induced by tectonic and volcanic activity in Ladinian time. Decompaction calculations of the Ladinian sediments and stratigraphic/geometric restoration of overlying Carnian succession shows a subordinate influence of compaction-induced subsidence on development of accommodation space. Total subsidence rates for the Pora platform are between 80m/Ma (platform core) and 170m/Ma (basin) and were strongly outpaced by sedimentation rates. At the end of the Longobardian the basin had been completely filled and the initial bathymetry between platform and adjacent basin was nearly levelled. Karst features (Calcare Rosso) on top of the entire platform indicate subaerial exposure at the end of platform growth, induced by a global sea-level fall.