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Norian-Rhaetian sedimentary evolution of the Slovenian Basin (eastern Southern Alps)

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The Slovenian Basin represents a Mesozoic deep water sedimentary environment, during the Triassic situated on the southern passive continental margin of the Neotethys (Meliata) Ocean (cf. Schmid et al., 2008). The Norian-Rhaetian sedimentary evolution of the Slovenian Basin is reconstructed on the basis of five sections located in different parts of the Tolmin Nappe (Eastern Southern Alps, western Slovenia). The correlation of sections is based on conodont data and facies analysis. The Norian-Rhaetian interval is in the basin represented by the "Bača dolomite" (bedded dolostone with chert) and the Slatnik Formation (hemipelagic and allodapic limestones), while the bordering reef-rimmed carbonate platforms in inner areas record peritidal deposition (Main Dolomite, Dachstein Limestone).

The transition from claystone and marly limestone dominated "Amphiclina beds" to the bedded "Bača dolomite" took place at the Carnian-Norian boundary. The change in facies can be attributed to the eustatic rise of sea-level and the subsequent retreat of terrigenous input. Intensive basin-wide slumping took place during the Early Norian and marks a short period of tectonic activity. Slump breccias are followed by bedded dolostones. An increase in terrigenous input in pyrite-enriched thin-bedded dolostones indicates a relative sea-level fall (cf. Haas, 2002) at the Early-Middle Norian boundary. The Middle-Late Norian sedimentation is dominated by bedded dolostones. The microfacies analysis of scarce non-dolomitized horizons indicates hemipelagic deposition and sedimentation from distal turbidites, with material derived from adjacent platform. An interval of slump breccias suggests that another tectonic pulse took place during the Middle Norian. The Late Norian in the northern part of the Tolmin Nappe already belongs to the Slatnik Formation, which spans the rest of the Triassic, while in other parts of the Basin the "Bača dolomite" continues up to the Triassic-Jurassic boundary. The Norian-Rhaetian boundary (based on *Misikella posthernsteini*) is marked by transition to more coarse grained, i.e. turbidity currents dominated sedimentation. Coarsening and thickening-upwards succession from packstones to boulder breccias is interpreted as a forced regressive wedge of the falling relative sea-level. The following thinning and fining-upwards succession marks the beginning of the sea-level rise and ends abruptly at the Rhaetian-Hettangian boundary with a few meters thick package of thin-bedded hemipelagic limestones. The lack of coarser platform material can be attributed to (A) the rising sea-level, or (B) to another fall of sea-level, coupled with a biocalcification crysis. Locally, extensional tectonics led to bottom differentiation. The Late Norian and Rhaetian tectonic activity was spatially limited to individual parts of the basin. Ooidal and peloidal allodapic limestones of the overlying Early Jurassic Krikov Formation mark renewal of carbonate production on the adjacent carbonate platform.

The Norian-Rhaetian deposition in the Slovenian Basin was thus marked by eustatic changes and extensional tectonics. The later reflects the diminishing Neotethys rifting and the incipient opening of the Alpine Tethys area (Haas & Budai, 1999; Cozzi, 2000; Haas, 2002).

References: Cozzi, 2000, Basin Research, 12, 133-146. Haas, 2002, Geologica Carpathica, 53, (3), 159-178. Haas & Budai, 1999, Geologica Carpathica, 50, (6), 459-475. Schmid et al., 2008, Swiss Journal of Geosciences, 101, 139-183.