



## **Reconstruction of the diagenetic history of the Middle Triassic Csukma Dolomite (Mecsek Mts. and Villány Hills, SW Hungary)**

Georgina Lukoczki (1) and János Haas (2)

(1) University of Pécs, 7624 Pécs, ifjúság útja 6, Hungary (lukoczki.georgina@gmail.com), (2) Eötvös Loránd University, 1117 Budapest, Pázmány Péter sétány 1/c, Hungary

Pervasive dolomites of the Ladinian Csukma Formation of SW Hungary have been studied to reconstruct their diagenetic history.

Based on petrographic investigation of thin sections from drill cores and surface samples and the results of earlier works, the dolomicrites, micro-sucrosic and sucrosic dolomites of the Csukma Formation represents a shallowing upward sequence above the deepest facies of the Triassic succession (Zuhány Limestone). The Csukma Dolomite is overlain by peritidal marly dolomites in the Villány Hills (Templomhegy Dolomite) meanwhile it is followed by a gap in the Mecsek Mts. Identification of the microfacies-types is often difficult or it is hindered by recrystallization. Based on the crystal size and the degree of textural preservation, basic dolomite texture types have been defined: fine, medium and coarse crystalline dolomite with no, moderate or good fabric preservation and their combinations.

Thin section observations under CL, complemented by stable isotope measurements (carbon and oxygen) aimed to define the diagenetic events and their sequence. Microthermometric measurements were impossible to perform because of the lack or tiny size of fluid inclusions.

Diagenetic history of the two areas is quite similar; however, tectonic evolution of the Mecsek Mts. and the Villány Hills was different from the Upper Triassic onwards, which resulted in different subsidence rates in the two areas. Shallow burial dolomitization of lime-mud resulted in the formation of fine and medium crystalline replacement dolomite. In the Villány area limpid, zoned syntaxial overgrowth cements were formed in the open pore-spaces during early diagenetic processes. Increasing burial caused pressure solution and later fractures were filled by medium crystalline zoned dolomite cements probably in intermediate burial depth during the Late Jurassic. In the Mecsek Mts. the limpid early dolomite cements are missing or obliterated and subsidence already accelerated in the Late Triassic. Similarly to the Villány Hills, medium and coarse crystalline zoned dolomite cements were formed in this intermediate burial setting. Saddle dolomites were formed during deepest burial probably during the Early Cretaceous (Valanginian-Aptian) in the Villány Hills and during Late Jurassic–Early Cretaceous (Tithonian-Valanginian) in the Mecsek Mts. Isotope values suggest seawater dolomitization at elevated temperature ( $\delta^{13}\text{C} +2.2\text{‰}$ ,  $\delta^{18}\text{O} -8.0\text{‰}$ ). Uplifting initiated in late Early Cretaceous (Albian) in the Villány Hills, and in Late Cretaceous (Santonian) in the Mecsek Mts. Fractures cemented by calcite veins of meteoric origin ( $\delta^{13}\text{C} -2.4\text{‰}$ ,  $\delta^{18}\text{O} -12.7$ ) were probably filled in this period, although the dating of diagenetic phases is uncertain. Bulk samples of the basic dolomite litho-types show values similar to Ladinian seawater ( $\delta^{13}\text{C} +1.4\text{‰}$  to  $+2.3\text{‰}$ ;  $\delta^{18}\text{O} -3.8\text{‰}$  to  $-1.5\text{‰}$ ) thus the dolomitizing agent might have been the seawater and no significant temperature elevation can be implied. Values of samples from the same litho-types are in good accordance with each other, differences might be caused by different burial depth. Further geochemical investigations are required to establish a clear trend and to reveal a more detailed diagenetic history of the Csukma Formation.

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