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DISSOLUTION RATE OF RECRYSTALLIZED CARBONATE ROCKS FROM THE BÜKK MOUNTAINS (NE HUNGARY): THE EFFECT OF ROCK TEXTURE

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The investigation of dissolution kinetics of carbonate rocks has been an important issue since the late 1970s. The early works were focused primarily on the understanding of carbonate dissolution and precipitation processes in marine environments and during the diagenesis. The dependence of dissolution rate on the composition and dynamics of the dissolving fluid as well as on textural factors such as grain size and surface roughness were studied in detail. Recent works focus on the dissolution processes of karstic regions, which are environmentally highly sensitive areas (e.g. the IGCP 379 project or the FRACFLOW project).

This paper summarises the results of dissolution experiments completed on samples of different carbonate facies from the Bükk Mountains (NE Hungary). All investigated limestones are of Triassic age and had been recrystallized by the Alpine metamorphism up to very low – low grade. Some of these stratigraphic units have been the scene of recent and ancient karst formation. Our experiments include runs of dissolution tests on both karstic and non-karstic limestone formations.

The rotation disk technique (see e.g. ZAIHUA & DREYBOLT, 1998) was applied to investigate the dissolution rate. Since the main question was how the dissolution process depends on textural parameters of the rocks, the experimental conditions were set up for "reaction-controlled" dissolution. Consequently, low degree of undersaturation and high rotation speed were chosen (3×10^{-4} mol/l initial $CaCO_3$ solution, low CO_2 pressure, 600–2500 rpm).

To control the changes at the rock's surface (a polished and etched disk cut from a drill core), the surface roughness was measured before and after a dissolution cycle by a laser scan micrometer and the texture was characterised by optical methods.

The results show that - considering textural parameters -, the dissolution rate depends not only on the grain size and surface roughness but also on the textural position of the grain. Coarse grains of calcite vein fillings that are of pre-metamorphic origin are dissolved at the same rate as the microcrystalline matrix. Conversely, the post-metamorphic vein fillings are dissolved significantly slower.

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