

The Study of Weathering Effects on the Slovenian Limestones by SEM

Simona Jarc (simona.jarc@ntfgeo.uni-lj.si) & Breda Mirtic (breda.mirtic@guest.arnes.si)

University of Ljubljana, Dept. of Geology, Askerceva 12, 1000 Ljubljana, Slovenia

Seven samples of limestones from Slovenia were investigated by electron microscope to evaluate the effects of atmospheric weathering. Samples were chosen from several active or temporary active limestone quarries: Hotavlje, Lesno Brdo, Drenov Gric and Lipica. Samples of fresh rock and weathered rock from the abandoned parts of the quarries were taken as well. The weathered rock samples were exposed to weathering conditions and effect of different organisms for about thirty years.

Backscattered and secondary electron images (SEM) can be useful in studies that aim to quantify the relative degrees of weathering of different minerals in natural rock samples or to identify the nature of weathering crusts developed on them (Kransley et al., 1998). The influence of weathering was observed by comparison of fresh and weathered samples; the processes involved are mostly: dissolution of the rock, insolation and the effect of organisms. Most commonly all the processes interfere so that their influences cannot be distinguished.

A detailed characterization of the investigated limestone was described by Jarc et al., 1995. Upper cretaceous shallow marine limestone from Lipica, variegated upper Triassic limestone from Hotavlje and Lesno Brdo are almost pure CaCO_3 ; the content of CaCO_3 is above 95 wt%. Black upper triassic limestone from Drenov Gric contains the lowest amount of CaO - above 91 wt%. Therefore, the high differences in weathering durability of the limestones are not caused by the chemical and mineralogical composition, rather are the result of limestone texture. The size of the calcite crystal and its habit are the most important features in defining the weathering characteristics of limestone. The content of impurities in calcite lattice is also important, too.

Kransley DH, Pye K, Boggs SJr & Tovey NK, *Backscattered scanning electron microscopy and image analysis of sediments and sedimentary rocks*; Cambridge University Press, 193, (1998).

Jarc S, Mladenovic A & Mirtic B, *First Croatian Geological Congress, Opatija, Proceedings 1*, 1, 235-237, (1995).