Geophysical Research Abstracts
Vol. 20, EGU2018-10948, 2018
EGU General Assembly 2018

Relationship between microstructure vs. freeze-thaw and salt durability of Hungarian porous limestone

Zita Pápay, Nikoletta Rozgonyi-Boissinot, and Ákos Török

Budapest University of Technology and Economics, Engineering Geology and Geotechnics, Budapest, Hungary (torokakos@mail.bme.hu)

The Hungarian Miocene porous limestone from Sóskút is one of the most intensively used construction material in Hungary. It has been applied in historic structures from the Roman period until the first half of the 20th century. This Sarmatian limestone is very similar to the limestones used in the architecture of Vienna and Lednice-Valtice area. The Hungarian occurrence displays various lithotypes that are characterized by different petrophysical properties. These lithologies show various rate of decay, i.e. have different resistance against environmental stresses, such as freeze-thaw or salt attack. In masonry these lithotypes with different durability were built in side by side; now displaying dissimilar damage. The differences in properties can also enhance differential and accelerated decay. In this study eight porous limestones were studied: 2 fine grained ones, 4 medium grained ones and 2 coarse grained lithotypes. Open porosity values were in between 20.1 V/V% and 36.1 V/V% and indirect tensile strength had a range in between 0.62 MPa and 1.48 MPa. Other parameters such as bulk density, water absorption and ultrasonic pulse velocity were also determined prior to salt weathering and freezing-thawing tests. Samples were exposed to sodium sulphate crystallisation tests (EN 12370) and freezing- thawing cycles (EN 12371).

The test results show that the microstructure and textural properties influence the weathering resistance of Miocene porous limestone. The fine grained lithotype was the least resistant against freezing-thawing and salt crystallisation and it was completely destroyed after the tests, while medium and coarse grained stone types were more durable.