



Monitoring of moisture levels with microwave sensors at the carved rock town Uplistsikhe, Georgia

Stefanie Fruhmann¹, Giorgi Basilaia², Mikheil Elashvili², Tea Munchava², and Oliver Sass³

¹University of Graz, Department of Geography and Regional Science, Graz, Austria (stefanie.fruhmann@uni-graz.at)

²School of Natural Sciences and Engineering, Ilia State University, Tbilisi, Georgia

³Chair of geomorphology, University of Bayreuth, Germany

A variety of weathering processes is controlled by moisture movements in porous rock. However, the quantitative assessment of small-scale moisture levels and fluctuations in-situ, over longer time periods, is still a challenge. The aim of our investigation is to close this gap with a microwave-based moisture monitoring system, installed at the cave town Uplistsikhe in Georgia, which oldest structures date back to the early Iron Age (10th-9th centuries BC).

Two morphologically different cave structures were equipped with two pairs of sensors, each covering two depth ranges, at two positions to detect different moisture contents and sources. These are considered the main driver of the highly accelerated weathering processes and decay of Uplistsikhe.

With the long moisture monitoring dataset of 12 months, combined with meteorological data from the study site, seasonal moisture variations and environmental-rock interactions are detected. Preliminary data from the first eight months of monitoring is presented.