



Black weathering crusts versus host rock: the adverse effect of air pollutants in Central- and West-Europe

Orsolya Farkas (1), Siegfried Siegesmund (2), Tobias Licha (3), and Ákos Török (1)

(1) Budapest University of Technology and Economics, Engineering Geology and Geotechnics, Budapest, Hungary (torokakos@mail.bme.hu), (2) University of Göttingen (Georg-August-Universität), Department of Structural Geology and Geodynamics, Göttingen, Germany, (3) University of Göttingen (Georg-August-Universität), Department of Applied Geology, Göttingen, Germany

Black weathering crusts were collected from the buildings of seven Central- and West-European countries. The samples were studied in details in order to assess the composition of damage layers and underlying host limestones. The boundary between the weathering crust and host rock was analysed by plane polarized light microscopy (PPL) and cathodoluminescence microscopy (CL). The morphology of the crust surface was also visualized by SEM. The crust is primarily composed of gypsum which appears in different morphological forms such as: tabular, rosette-like, acicular crystals or as crystal aggregates. In between gypsum crystals of the crusts and on the surfaces of crystals transportation related spherules (e.g. diesel soot particles) were depicted. The chemical and mineralogical composition of the black weathering crusts and the host rocks are significantly different according to XRD, IC and GC-MS analyses. The calcium ion, the sulphate and PAH concentration of gypsum rich crust were much higher than that of the host rock. This demonstrates that air pollution causes irreversible changes in carbonates and leads to the formation of sulphate-rich crust on limestone substrate throughout Europe.