Composition of dust and the formation of black weathering crusts in Hungary and Germany

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Dust has a significant contribution to the formation the formation of black weathering crusts. Various limestone buildings showing black soiling were studied in Germany and in Hungary. Dust, crust and limestone samples were collected and analysed to understand the contribution of dust to black crust formation. Test methods included microscopic and SEM analyses and detection of mineralogical composition by using XRD. Since some elements and organic carbon act as catalyst for crust formation trace element distribution (LA-ICPMS) and organic carbon content were also detected.

According to analyses gypsum is the main secondary mineral of limestone weathering crusts both in rural and urban areas, although there are different concentrations detected in Germany and Hungary. Siliceous and carbonaceous fly-ash particles were found in both countries with the prevalence of the former one. Lead mostly accumulates in dust, but also common in the black crust. Surprising high concentrations were found at the crust/limestone boundary in the samples of Budapest and Cologne city centre. The dust composition reflects the setting but does not necessarily a good indicator of the environmental conditions.

Constructional problems at interventions into slaty sedimentary rocks in Slovenia in terms of fabric and composition

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In Slovenia, several open excavations and tunnels have been constructed in tectonically weakly metamorphosed shaly, silty to sandy sedimentary rock formations of Carboniferous age. During a typical process of excavation rocks are subjected to changes in stress direction, which can result in different types of failure. To a large extent, these failures depend on the direction of loading in relation to the most pronounced types of discontinuities. During design stage of road structures in Slovenia, however, incomparably greater attention is paid to the relevant laboratory geomechanical factors than to the effect of the textural-structural and mineralogical properties of the rocks. It is only in recent years that some attention has been paid to the research into the connection between the textural-structural and mineralogical properties of slates and clay-containing rocks and their weak geomechanical behaviour. Nevertheless, these researches are not taken into serious consideration yet. In order to determine more accurately the type of relationship between the petrographic characteristics of these rocks and their resistance to the point load, a series of petrographical analyses and corresponding point load strength index tests were performed. Samples were taken from trial boreholes and at excavation sites of the rock mass for the tunnels of the Ljubljana area as well as from the wider area of earthworks for the Ljubljana - Celje motorway in central Slovenia. The investigated rocks have mud to sand grain size. From the structural point of view, they exhibit clear dynamo-metamorphic changes. They are manifested with the occurrence of folds, crenulations, strong secondary foliation s_1, differential cleavage and fracture porosity. In contrast to primary foliation s_0, where the grains are intergrown, secondary foliation s_1 is smooth, and only insignificant intergrowing of the grains can be observed. At the micro level these deformations are expressed as recrystallization (mainly degradational), new growth,