considered to represent the number of earthquakes at any time t and the parameters of the model were estimated using the Yule–Walker equations.

Weathering of building stones of the Medieval Sasov Castle in Slovakia: Indication and impact of the mineral alteration

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The ruin of the medieval Sasov castle, a cultural heritage object in the Middle Slovakia, suffers from a strong deterioration. Besides the weathered binder, a reasonable part of the damages is caused by the intensive weathering of the building stone. The walls are built mainly of Neogene andesite, which is common in this area of the volcanic Stiavnicke Vrchy Mts. The sound rock is of dark grey colour, but most of the building stones have yellowish-brown coatings of iron oxyhydroxides on the surface and in the fissures. Highly macro-porous stones are most affected by the alteration. Weathering of the andesite was studied within the project VEGA 1/0413/09 of the Ministry of Education of the Slovak Republic.

The X-ray diffractometry (XRD) of the powdered weathered building stone showed that the mineral assemblage is dominated by the plagioclase andesine (63 wt%) and the main alteration product smectite (up to 22 wt%), the rest are amorphous phases/volcanic glass (13 wt%), augite (1 wt%), magnetite (1 wt%) and traces of mica. The building stone material was compared with the rock material from an old local quarry, which was assumed to be the source of the building material for the castle walls. The study with polarized light microscopy (PM) of thin sections revealed the glomeroporphyritic character of this rock, i.e. phenocrysts of the same type (here plagioclase) are partly grouping into distinct clusters. There are three types of plagioclase: 1. sound plagioclase with regular shape and typical crystal twinning, 2. phenocrysts exhibiting growth zoning, and 3. plagioclase disintegrated due to magmatic corrosion. The corrosion creates alteration rims around the plagioclase grains or intrudes the whole mineral. A secondary mineralisation can be seen in some fine cracks cutting the phenocrysts, as well. The alteration of mafic minerals (augite, magnetite, mica) resulted in opaque phases. The rock matrix is built of volcanic glass, fine-grained plagioclase and some not identified brown phases. These are probably products of a post-magmatic alteration, i.e. weathering and/or post-volcanic hydrothermal alteration processes, very common in Neovolcanites.

The results from XRD, PM and tests on physical properties confirmed a very good match of the building stone material with the most altered parts of the rock mass in the local quarry. Therefore, a comparison with the sound rock from the deeper parts of the quarry was used for the illustration of the alteration impact on the rock properties. The sound rock consists of andesine (≈ 62 wt%), the rest are amorphous phases (27 wt%), augite (8 wt%) and magnetite (3 wt%), no smectite is present. It means that amorphous phases are the most unstable components of the rock. With the alteration, smectite appears and its content is increasing (up to 22 wt%), while amorphous phases, augite, and magnetite are decreasing. A considerable part of the macro-pores is the result of selective leaching of weathering products. Total porosity increased from 2.4 % to 21.2 %, the effective porosity from 2.2 % to 15.0 % when compared with the sound rock. The uniaxial strength (tested by the point load test) dropped from 270 MPa (sound rock) to 51 MPa in the weathered, but still coherent macro-porous stone. However, the most altered building stones are almost white and disintegrate into sand. Cyclic volume changes due to smectite swelling and water freezing in the effective pores probably weaken the structure and enhance the deterioration. Both processes are supported by the high water uptake due to the high smectite content, reflected also in the results of the Enslin-Neff tests. Therefore, ruins should be prevented from the infiltrating

water precipitations (rain, snow) by roofing of the wall crowns. Missing or deteriorated building stones could be replaced by material taken from the deeper parts of the local andesite quarry.

Geology of the Caucasus and adjacent areas: 1:2 500 000 scale geological map

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The geological map of the Caucasus and adjacent areas of 1:2 500 000 scale, being presented on the 19th Congress of the CBGA includes on-shore and off-shore parts of the Black Sea-Caspian Sea region (Fig. 1). Small-scale thematic (geologic, tectonic, metallogenic etc) maps of the World and its large parts, such as Europe, Middle East etc., have been periodically compiled and published under umbrella of the Commission for Geological Map of the World (CGMW), for example: carte geologique de l'Europe, 1:10 000 000, 1970; carte tectonique de l'Europe et des regions avoisinantes, 1:10 000 000, 1975; carte tectonique internationale de l'Europe et des regions avoisinantes, 1:2 500 000, 1980; geological map of the Middle East, 1:5 000 000, 1986; 1:5 000 000 International geological map of Europe and adjacent areas, 2005, BGR Hannover; the international geological map of the Middle East, 1:5 000 000, second edition, 2009-2010. The Caucasian region, situated at the junction of the European and Asiatic segments of the Alpine-Himalayan orogenic belt and serving as a connecting link between these two branches, as a rule, is illustrated by maps of the both segments. The presented map demonstrates up-to-date level of knowledge on geological structure and evolution of the region.

Mapping the spatial distribution of precipitation, biological soiling, and decay on monuments in Northern Ireland: towards understanding long-term stone response to moisture

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The Natural Stone Database for Northern Ireland was constructed to address the paucity of information available to stone conservation practitioners. Almost 2000 listed buildings, 260 monuments and 118 quarries were surveyed over three years to produce an interactive GIS database for the Northern Ireland Environment Agency. This contains information on stone sources, together with details of stone condition and decay processes and is complimented by a website available to the general public. This paper uses elements of this GIS to link annual rainfall data for Northern Ireland with information on the biological soiling, and decay of stone monuments across the province to examine the relationship between moisture and availability on these processes. Results suggest that biological soiling is indeed strongly influenced by moisture availability (i.e. precipitation), with higher levels of biological soiling evident in the wetter North-West of Northern Ireland where annual precipitation is higher in response to a strong Atlantic signal. This compares to lower levels of biological soiling evident in the more rain-sheltered South-East of the province. Stone deterioration appears to be less influenced by climate and more closely related to the geology characteristics with higher levels of decay often observed on sandstone monuments and lower levels of decay associated with areas in which low porosity stone types such as basalt predominate. The results have clear implications for future patterns of soiling in light of projections for regional climate change that indicate increased winter wetness, but they also demonstrate the