

THENARDITE-EFFLORESCENCE INDICATING CAUSE OF THE EXCESSIVE FLYSCH EROSION, SLANI POTOK, CROATIA

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Significant amount of Mid-Eocene flysch is present in the coastal parts of Croatia. In the whole region flysch is subjected to the erosion to lesser or greater extent. However, there is an excessive flysch erosion in Slani potok ("Salt creek") catchment (in the area of Vinodol) which, together with accompanying landslides, covers an area of approx. 3 km². At this location, the total site degradation takes place forming terrains of "badlands" type. Slani potok flysch, as also the one from surrounded area without excessive erosion, is represented mainly with calcareous clayey siltstone and calcareous silty claystone and to lesser extent with marls and silty sandstones. There are no significant differences in the mineral content and grain size distribution of clayey siltstone and silty claystone in the whole area of Vinodol. These rocks contain muscovite and illitic material (up to 30wt%), quartz (up to 25wt%), calcite (up to 15wt%), feldspars (up to 10wt%), chlorite, kaolinite and smectite, and in some samples small quantity of pyrite. There is a great amount of small particles. The particle size fraction < 2 µm and fraction 2–4 µm sum up to 45wt% and to 15wt%.

However, the appearance of efflorescent salt crust on flysch in Slani potok during dry period of the year is unique in the area. The mineral content of white salt crust determined by XRD is represented by thenardite (sodium sulphate) and negligible amount of gypsum. The largest thenardite crystallites observed by means of a scanning electron

microscope (SEM) have a diameter of 2 µm. Occurrence of this water soluble mineral indicates that some components of flysch encompass sodium, which accelerates desintegration followed by intensive erosion.

A series of physical and chemical tests are carried out in an attempt to verify mentioned assumption. Flysch samples are submitted to physical tests of stability (pinhole test and cyclic dry-wet repeat treatment) indicating high soil erodibility. Determination of soluble salts in flysch pore water was carried out following modified procedure used by the International Soil Reference and Information Centre (Reeuwijk, 2002). Based on criteria established by Sherard et al. (1976), analysed flysch fall in the group of dispersive, i.e. erodible soils. The analysis of stream water for soluble salts was carried out as well. Obtained concentrations of Na⁺ and SO₄²⁻ are manyfold of the average contents in running surficial waters.

Illustrated appearance of thenardite is the first finding of this mineral in Croatia.

References

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