

treatment of negatives and positives, season of the year and time of day when the photo was taken, as well as environmental factors such relief, hydrographic network, presence of vegetation and buildings.

Geological photointerpretation of the investigated area supplied a lot of informations. We can find there e.g. that massive rocks like sandstones built peaks and ridges, more soft rocks, like shale or shale-sandstone complexes build the valleys. When stratification is marked we can interpret fold structures and find faults that cut the structure. It is possible to indicate same intersection lines, the boundaries of lithological complexes or thrust lines. In the investigated area the overthrust of the Magura Nape is especially well visible. It is possible to distinguish also fluvial terraces, landslides, bedding of rocks and to separate Quaternary deposits from their older basement. The photointerpretation performed in this way led to geological sketch of the investigated area.

Verification of this material is possible by comparison of the photointerpretative sketch with a geological map. The differences in location of given elements on the two maps are determined by several factors: the way of the map preparation, misplacement of an element on the geological map and difficulties with an interpretation on the areas covered by abundant vegetation.

Ostaficzuk S. 1978 *Fotogeologia. Fotointerpretacja i fotogrametria geologiczna* Wydawnictwa Geologiczne, Warszawa

Biogeochemical role of microorganisms in the formation of carbonate microbialites: a review

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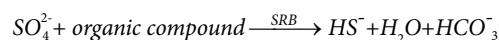
Microorganisms are the oldest life forms on Earth. The current shape and composition of the oxidizing atmosphere is the result of over three billion years of the activity of living organisms that continue to shape and modify it (Tice 2008).

Biogenic rocks called microbialites are evidence of the activity of microorganisms living in remote geological ages. The formation of these carbonate structures is linked with the emergence of metabolic processes carried out by symbiotic microorganisms living in consortia. As a result, microbial mats are produced. They are often characteristic of extreme environments, such as hypersaline water reservoirs, acid lakes, hot springs or extremely cold Antarctic area (Chafetz & Buczynski 1992).

Life and development in extreme conditions depend on close physiological relationships between organisms that form part of the mat structure. The microbial structure is characterized by stratification of "sub-environments", which are inhabited by microorganisms typical of the physico-chemical conditions within each level. The presence of zones with particular groups of microorganisms in the mat succession is associated with variable redox potential. Photosynthetic cyanobacteria develop in the subsurface oxic zone with direct access to sunlight. Among the group of anaerobic organisms that build the microbial mat-type structure are bacteria that reduce sulfates in anaerobic conditions (SRB) and phototropic bacteria oxidizing sulfur compounds (Dupraz, Visscher 2005).

One of the major groups of anaerobic bacteria significant for many geological processes are sulfate-reducing bacteria. They participate in nearly all processes of mineral and rock for-

mation. They can take an active part in precipitation of calcium carbonate, which is responsible for the lithification of microbial mats. These heterotrophic organisms induce formation of carbonates through the production of HCO_3^- as a result of mineralization of organic compounds, which they use as the carbon source (Wolicka, Borkowski 2008):



If calcium ions are present in sufficient quantities in the environment, and there are optimal physical and chemical factors such as pH, concentration of organic compounds and the presence of crystallization nuclei, this can lead to precipitation of calcium carbonate. Carbonate minerals such as calcite and dolomite are found in environments typical of SRB and in conditions favoring sulfate reduction. Precipitation of calcium carbonate and consequently lithification of microbial mats favor the development of microbialites. Carbonates play the role of specific cement thus creating an opportunity to preserve these deposits even in high-energy environments (Tice 2008).

Chafetz, H. S., Buczynski, C. 1992 Bacterially induced lithification of microbial mats. *Palaios* 7: 277-293

Dupraz, C., Visscher, P. T. 2005 Microbial lithification in marine stromatolites and hypersaline mats. *Trends in Microbiology* 13: 429-438

Tice, M. 2008 Palaeontology: Modern life in ancient mats. *Nature* 452: 40-41

Wolicka, D., Borkowski, A. 2008 Participation of sulphate reducing bacteria in formation of carbonates, Geobiology of stromatolites, *International Kalkowsky-Symposium*, Göttingen: 130-131

Comprehensive assessment of the main factors of landslide processes formation and activation in Carpathian region

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Permanent activation of landslide phenomenon in the Carpathian region and their negative impact on technological systems increasingly requires a deep understanding of their origin and genetic features. It is important to determine the complex of interactions between factors, which influence their formation, especially in areas of intensive disintegration of the flyschoid complex. A special difficulty is the formation of structural landslides within the zones that have acquired extensive development in Carpathian region.

Carpathian model polygon was used for studying the dynamics of formation and activation of hazardous landslide processes. Geological explorations were done in Svalyavskiy, Volovetskiy and Irshavskiy regions of the Zakarpatska area. The detailed analysis of the field data allows to select the main factors of landslides' activation. They are: geomorphologic, landscape-climatic, lithologic and stratigraphic, meteorological, neotectonic, seismic and structural-tectonic.

Carpathian polygon has a complicated heterogeneous geological structure. It consists of complexes of sedimentary, volcanic and unconsolidated sediments of Jurassic, Cretaceous, Palaeogene, Neogene and Quaternary age. It should be noted that flyschoid formation prevails among the sedimen-