

The paleo-relief influence on sedimentation and diagenesis and the significance of this process for prediction of geohazard potential in the excavations of the KGHM mines

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Keywords: non uniform compaction, paleo-relief, hydrogen sulfide mining hazard

Paleo-relief after eolian sedimentation influenced distribution of transgressional muds, which accumulated in depressions between sandy elevations. Constantly increasing volume of carbonate deposits privileged its rapid lithification in contrast to muds which still preserved high compaction potential. Direct indicators of differentiated mechanical parameters of described rocks are clastic dikes.

Early diagenesis resulted in a set of lithified carbonate plates overlaying muds or supported directly on sandstone paleo-elevations tops. Such a suite of layers indicates that deformations of the carbonate plate during early diagenetic stage should be taken into account and consequently we may expect a retarded influence of sandstone paleo-relief on sedimentation of even younger rocks - evaporitic sulfates and chlorides.

There is negative correlation of lower anhydrite and copper bearing shales thicknesses, as mud compaction probably had controlled location of evaporitic paleo-environments - the salt pans and separating them anhydrite elevations. In the top part of the lower anhydrite, in the pan areas, bituminous, laminated anhydrite was distinguished. Hydrosulfide in these parts were recognized.

In the KGHM copper mines hydrogen sulfide hazard occur. H₂S derives from the overlaying evaporates and carbonates (Main Dolomite). Migration paths are created mostly by reopening of formerly existed or by newly created cracks due to rock mass relaxation above the mining excavations.

As indicated above occurrence of bituminous rich parts of lower anhydrite can be predicted, by recognizing location of sandstone paleo-elevations and depressions between them, mainly by measuring the shale thickness in the forecasting profiles.