Rockfall Susceptibility Zoning and Evaluation of Rockfall Hazard at the Foot Hill of Mountain Orliagas, Greece

Papathanassiou G., Valkaniotis S. and Chatzipetros A.

Department of Geology, School of Geology, Aristotle University of Thessaloniki, 54124, Thessaloniki, Greece, gpapatha@auth.gr, ac@geo.auth.gr

Rockfalls are frequently generated in mountainous areas and threatened manmade environment. Therefore, the detachment of large size boulders and their fall track are issues that should be evaluated for urban planning and the construction of lifelines and road networks. In order to achieve this, several methodologies had been proposed and applied, regarding the evaluation of the landslide hazard. The most known methods concern the application of GIS software for the evaluation of the run-out distances of boulders and the simulation of the fall tracks. In this article, a delineation of areas susceptible to rockfalling at the foothills of mountain Orliagas, Greece, is provided using the minimum shadow angle method and, in addition, selected case studies of rockfalls were studied. These cases were simulated and analyzed using the Rockfall software while the employed parameters were tested and calibrated using silent witnesses. The outcome provided by this study, is that the simulated fall track and the rockfall run-out distance were in agreement with the spatial distribution of the reported boulders while the total kinetic energy and the bounce height during the fall track have been evaluated, thus can be used for the construction of remedial measures. In addition, as it is shown in the resulting by this study maps, the area between the villages of Ziakas and Spileo can be separated into two zones, A and B, regarding the landslide hazard for the road network which is evaluated as low and very high, respectively.

A Newly Discovered Fossil Stratabound Hydrothermal Manganese Deposit at Aspro Gialoudi, N.W. Milos, Greece

Papavasileiou K.T.[1], Glasby G.[2], Alfieris D.[3], Voudouris P.[4] and Mitsis I.[1]

[1]*Faculty of Geology and Geoenvironment, University of Athens, Department of Economic Geology& Geochemistry Panepistimiopolis A.Ilisia Athens 15784/Greece, papavas@geol.uoa.gr*
[2]*University of Gottingen, Department of Geochemistry, GZG, Goldschmidtstr.1 Gottingen, Germany*
[3]*S&B Industrial Minerals S.A., A.Metaxa 15, 14564 Athens, Greece*
[4]*Faculty of Geology and Geoenvironment, University of Athens, Department of Mineralogy& Petrology, Panepistimiopolis A.Ilisia, Athens 15784/Greece*

The white smoker Mn-Ba-Pb deposit at Aspro Gialoudi in NW Milos is shown to be a fossil stratiform exhalative hydrothermal deposit analogous to the Vani manganese deposit which is located about 1.3 km to the NE. Both deposits are located proximal to fault systems. However, the Vani manganese deposit is adjacent to the NW-SE-trending Vromolimni-Kondaros Fault which marks the western margin of the Gulf of Milos and is one of the major faults on Milos, whereas the Aspro Gialoudi deposit is adjacent to the relatively minor dimensions NE-SW fault on the west coast of Milos. Both the Aspro Gialoudi and Vani manganese deposits formed in a similar manner, namely by transport of hydrothermal fluids through the adjacent fault systems into a reservoir of volcanoclastic sandstone to produce a deposit initially consisting of pyrolusite and occasionally ramsdellite, which were later replaced by cryptomelane, hollandite, coronadite and hydrohaeterolite. Because the NE-SW fault on the west coast of Milos is minor compared to the Vromolimni-Kondaros Fault, the Aspro Gialoudi manganese deposit consisted mainly by cryptomelane, hollandite, coronadite and hydrohaeterolite, is very much smaller than the Vani deposit. The Aspro Gialoudi deposit has not been described before because of its remoteness and small size.

The hydrothermal manganese deposit at Aspro Gialoudi was formed little earlier to roughly contemporaneously with the Vani manganese deposit at about 1.8 Ma. by similar processes and are considered to be integral parts of the same hydrothermal system.

Movement along the NE-SW fault located on the western margin of Milos triggered the hydrothermal activity which resulted in the formation of this deposit which seems to be controlled by alternating cycles of deposition of sulfides and hydrothermal manganese oxides within the fault which were probably the result of alternating periods of waxing and waning of seismic activity along that fault. The hydrothermal fluids penetrated the volcaniclastic sandstone which hosts the Aspro Gialoudi deposit along fractures and fissures, which led to the formation of this deposit in two stages as at Vani. The intense low-temperature,hydrothermal activity would have been relatively short lived. Furthermore, based on the REE geochemical data the hydrothermal fluids that formed the Cape Vani Mn oxides and hydroxides formations were mainly seawater. Although the Cape Vani formations were in contact with oxidising seawater for a sufficient period of time, our geochemical data (depletion of Mg, Ca in relation to the continental crust) suggest that there was no significant alteration of these formations by seawater after their deposition.

In general, the compositional data show that the elements most enriched in the Aspro Gialoudi, Vani and Vani Dome deposits relative to the average continental crust (Wedepohl 1995), lie in the sequence As>Pb>Sb>Cd >Mn>Tl>Mo>Zn>Cu>Ba>Be>Sr>Co>Bi. All the other elements analyzed are depleted in these deposits relative to the continental crust. The chalcophilic elements, the siderophilic elements Mo and Co plus barium and strontium are therefore the most strongly enriched in the hydrothermal Mn deposits relative to the average continental crust.

Preliminary carbon and oxygen isotope data on carbonate sequences from the Pădurea Craiului Mountains, Romania. Paleoenvironmental significance

Papp D.C.[1], Cociuba I.[1] and Cuna S.[2]

[1]*Geological Institute of Romania, Cluj-Napoca Branch, 400379, Cluj-Napoca, Romania, deliapapp@yahoo.com; ioan_cociuba@yahoo.com*
[2]*National Institute of Research and Development for Isotopic and Molecular Technologies, 400293, Cluj-Napoca, Romania, Stela.Cuna@itim-cj.ro*

Isotope stratigraphy is a useful tool for stratigraphic correlation, especially for strata deposited during major perturbations of the carbon and oxygen cycles that affected the marine, terrestrial and atmospheric reservoirs. The Pădurea Craiului Massif (north-western extremity of the Apuseni Mountains, Romania) had a long-lasting evolution with a pre-Hercynian start, being mainly shaped during alpine orogenesis. Most of its formations belong to the Bihor tectonic unit. The basement is made up of crystalline schists of the meso-metamorphic Somes Series. Sedimentation started during Permian with detritic deposits interbedded with rhyolites. The overlying Triassic deposits are unconformable and include detritic formations (Lower Triassic) and massive layers of carbonate rocks (Middle Triassic). The almost complete lack of the Upper Triassic is due to the uplift of the region during the Cimmerian tectonic phase. The Lower Jurrasic deposits include the detritic formation (Hettangian–Lower Sinemurian), the limestone formation (Upper Sinemurian–Pliensbachian) and the marl formation with ammonites and belemnites (Toarcian). The Middle Jurassic consists mainly of marls. The Upper Jurassic formations are massive (over 100 m thick) and are made up exclusively of limestones. During the Upper Tithonian and Lower Cretaceous the limestone deposits have been uplifted which resulted in a paleo-karst surface that hosts discontinuous bauxite deposits. Lower Cretaceous sedimentation started with the deposition of fresh-water limestones (Hauterivian) followed by successive layers of marine limestones (Barremian), marls (Aptian), marine limestones (Aptian), glauconitic sandstone (Aptian-Albian) and ended with a package of red detritic deposits (Albian-Cenomanian?). After the intra-Turonian thrust movements, the Senonian sediments have a post-tectonic character and outcrop in several isolated area. Subsequent positive epirogenetic movements and two main phases of magmatic activity (Upper Cretaceous–Paleocene and Badenian–Pliocene) completed the morphogenesis of the Piatra Craiului Mountains.