The genesis of the base-metal mineralization from Scrind-Rachitele-Poiana Horea, Vladeasa Mountains, Romania

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Geological research carried out on the structural and lithostratigraphic relation between base-metal mineralization and medium-grade metamorphic rocks led to elucidation of their genesis. The massive and disseminated sulfide ores are localized in rhyolitic metaepiclastics and in overlying biotite-muscovite–micaschists of leptino-amphibolitic formation (SM_2) of Somes series (Upper Precambrian-Lower Cambrian), highly retrograded and crossed by laramide microgranites. The Somes metamorphites are developed as a horst between Vladeasa graben and Transilvania basin. Syngenetic, concordant, metamorphosed mineralization was formed by sulfide precipitation, fed by submarine hydrothermal activity. It is genetically associated to rhyolitic volcanism of island-arc stage evolution and belongs to metamorphosed hydrothermal volcano-sedimentary type. The following subtypes were identified taking into account the mineral assemblage and the lithostratigraphic and tectonic control:

1. syngenetic, stratiform, concordant, massive/disseminated Zn-Pb +/Cu, Au, Ag ore, consisting of pyrite (25-30%), arsenopyrite (7-10%), sphalerite (3.8-4.6%), galena (0,6-3,7%) pyrrhotite (0.6%),chalcopyrite (0.4-0.8%), tetraedrite, siderite, quartz, sericite, situated in the upper part of quartz-feldspar schists, at the boundary with the biotite-muscovite-micaschists. In the Alunis valley there are 2 bends which unify on the strike. The boundary is sharp at the bottom and clear or gradual at the top, by euhedral arsenopyrite dissemination. On the strike, the massive ore passes to pyrite-arsenopyrite disseminated ore. The banded massive ore, sometimes brecciated at the bottom, consists of broken porphyroblasts of pyrite and arsenopyrite, sometimes of 0.3-0.9 mm in size, associated with quartz, “cemented” by soft sulfides, included in siderite. The sphalerite contains coherent and incoherent exsolutions of pyrrhotite and chalcopyrite. The gold is included in the crystal lattice of sulphides. Galena, with tetraedrite exsolutions, has high contents of Ag. The Au:Ag ratio is about 1:10.

2. syngenetic, lenticular of Fe (siderite, magnetite) and Cu-Au ores (pyrite, arsenopyrite, chalcopyrite, pyrrhotite, quartz, sericite), in quartzose sequences of biotite-muscovite micaschists, overlying the quartz-feldspar schists. In Negru brook area, there are 3 lenses of massive pyritic ore which unify into one in the depth. In Gingineasa area, there are 2 orebodies, one of siderite and magnetite assemblage, at the lower part of the sequence, and another one of banded massive sulfide, mainly pyrite, arsenopyrite and chalcopyrite, at the top. Both are localized in highly retrograded biotite-muscovite-micaschists, with interbedded amphibolite of ten meters in thickness, crossed by crenulation cleavage and transposed on a cross fault plane. In banded iron ore, the magnetite grains have a core of siderite and they were probably formed during increasing O_2/CO_2 ratio. On a fault plane which cut the banded sulfide lenses, secondary pyrrhotite was formed as nests by conversion of pyrite during tectonic deformation.

3. metamorphosed hydrothermal sulfide ore, hosted by cross faults, consisting of siderite, as large porphiroblasts, pyrite, arsenopyrite, pyrrhotite, chalcopyrite and quartz, developed nearby the syngenetic, stratiform massive ore, or cross cutting them.

4. hydrothermal sulfide ore, formed by remobilizations and recrystallizations during synmetamorphic deformations and Laramide tectonic phase of Alpine cycle, in shape of discordant veinlets of galena in iron ore; of arsenopyrite on ”ac” fissures; of arsenopyrite, pyrite, chalcopyrite, siderite, and quartz (Agastau valley); as small lenses of arsenopyrite, pyrite and sphalerite (Cetatuia valley); as nests of steely galena, including large crystals of arsenopyrite (Alunis brook); as parallel vein, with the massive pyritic ore, consisting mainly of sphalerite and subordinate amount of pyrite, chalcopyrite, galena and fragments of iron ore and breccia column (Leurdis brook, mining works) made of sphalerite, pyrrhotite, galena, arsenopyrite, pyrite, siderite, quartz and fragments of micaschist, strongly affected by

chloritization. The breccia body was produced by a Laramide igneous body intrusion, highly affected by argillic alteration.The massive and disseminated sulfide ore has the same genesis as the sulphde ore deposits of the Tulghes Group, Eastern Carpathians.

Late Holocene vegetation history and human impact in Beles (Belasitza) mountain

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The palynological information from three peat-bogs in Beles (Belasitza) mountain located on the Greek-Bulgarian border allowed the reconstruction of the vegetation history and human impact during the late Holocene. One of the two peat-bogs, situated on the northern slope, has started its development ca. 2200-2000 years ago. By that time above the *Fagus* belt were growing groups of *Pinus* (most probably *Pinus sylvestris*). At lower altitudes the vegetation cover was composed of *Quercus* forests with *Carpinus orientalis, Ostrya carpinifolia,* partly *Tilia* and *Ulmus.* The distribution of *Castanea sativa* (sweet-chestnut) was still limited. The herb vegetation occupied open areas and among the great variety of species the presence of *Rumex, Plantago lanceolata, Scleranthus*, Cichoriaceae, Brassicaceae indicates human activity deserved attention. The most substantial change in the forest cover took place before 1760 cal. yrs. BP (III cent. AD). The sharp decrease in the total quantity of tree pollen testified to a short-term profound interference of Man which resulted in the destruction of *Fagus* communities thus causing lowering of the upper tree-line. Conifers were replaced by shrub lands of *Juniperus* and diverse herbs, mostly grasses. The increase in the presence of *Castanea* pollen appeared synchronous with that of *Platanus* and *Juglans.* Most likely, since historical time the formation of the recent belt of *Castanea sativa* has started on the northern foothills of the mountain. The relatively young age of the peat-bogs does not provide a definite answer about the natural or anthropogenic origin of sweet-chestnut forests. The find of cereal pollen from *Triticum*-type and *Secale* confirmed the cultivation of wheat and rye. The palynological information for the last centuries indicated a reduction of the areas formerly occupied by *Fagus,* an enlargement in the presence of *Juniperus,* at lower altitudes of *Carpinus orientalis/Ostrya carpinifolia* and partly *Quercus*. The core Beles from the southern slope of the mountain covers a relatively short period starting roughly at ca. 1350 AD. *Pinus* forests dominated up to the mid-XVI cent. AD but then were gradually restricted to their present-day limited occurrence. On the contrary, *Fagus* forests began their expansion by the end of phase B-a. Two sharp peaks in the expansion of beech, a large one by the end of XVII cent. AD, followed by a smaller one around the mid-XIX cent. AD, can be observed in the pollen diagram. These events reflected the existence of favorable climatic conditions, prevailing during these periods, and were also recorded in other mountainous areas of central and northern Greece (Pertouli, Voras, Paiko, Lailias, Rhodopes). Throughout the diagram, the impact of Man on the vegetation is clearly manifested. It started as stock-breeding (low *Cerealia* pollen values compared to *Plantago lanceolata*-type) at mid-altitudes and expanded to agriculture around the beginning of the Turkish occupation as shown by the pollen curves of *Cerealia*, *Rumex,* Chenopodiaceae, *Artemisia*, *Juglans*, *Castanea* and *Vitis*. After a recession which lasted from the end of XVII cent. AD up to the mid-XIX cent. AD, human impact was manifested as deforestation that took place in all vegetation zones of the mountain and the free areas were colonized mainly by grasses.