

New Mineralogical Data on the Mineralizations and Hydrothermal Alteration Zones of the Allumiere-Tolfa Historic Mining District, Central Italy

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The Tolfa-Allumiere mining district is located approximately 60 kilometers northwest of Rome (Italy) and has been characterized by a long-lasting history of exploitation for base metals (Pb, Fe), alunite, and kaolinite mineralizations. These deposits are genetically associated with the emplacement in an arc setting of a Plio-Pleistocene volcanic dome consisting of latites and rhyolites, which intruded sedimentary carbonate and siliciclastic country rocks. The intrusive event first produced contact metasomatism of the limestones and lately triggered hydrothermal activity, which caused widespread epithermal alteration of the volcanic rocks.

This study presents the preliminary results of mineralogical and geochemical investigations aimed at better understanding the development of the hydrothermal activity and the genesis of the mineralizations in the Tolfa-Allumiere area. The analysis performed on the altered volcanic rocks collected in old pits and outcrops allowed identification of three main alteration facies: residual silica, advanced argillic, and argillic facies. The residual silica facies is commonly sulfide-bearing, containing pyrite, As-pyrite, and cinnabar, with traces of sphalerite, galena, and chalcopyrite. In the advanced argillic facies, alunite occurs as aggregates of planar crystals in veins and cavities, is commonly zoned to natroalunite, and is intimately associated with vanberberite. Smectite marks the zones interested by argillic alteration. Regarding the metasomatized host rock, the carbonates show recrystallization with presence of sulfides (pyrite and cinnabar), Sr-sulfates, thorutite, thorianite, and fluorite. The epithermal assemblage in the volcanics and the metasomatized sedimentary rocks are affected by supergene alteration and gossan formation, which overprint the hydrothermal assemblage.

In conclusion, the preliminary results are in agreement with the occurrence of a magmatic-related hydrothermal system in the Tolfa-Allumiere area. More detailed investigation is needed to determine if mineralized zones of greater economic importance occur in the surroundings of the investigated sites as proposed in typical genetical models of precious metals epithermal systems.