Origin and metamorphic reworking of the Buca della Vena Tl-rich orebody (Alpi Apuane, Italy)

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The origin and evolution of an orebody hosted in metamorphic terrane is a prime topic in economic geology because they have implications on exploration as well as on related potential geo-environmental health hazards. The Alpi Apuane orebodies has long been known; however, their ore genesis and the relationships with the Apenninic age deformation and metamorphism is still a matter of debate. Indeed, they are still an interesting field of research, as proved by the recent discovery of a remarkable Tl anomaly associated to the baryte ± pyrite ± Fe-oxides ores of southern Alpi Apuane, northern Tuscany, Italy [1]. The present work reports a new detailed field and underground geological-structural investigation, performed from cartographic- to microscopic-scale, integrated by available drill-logs data, of one of these Tl-rich orebodies - the Buca della Vena ore.

The present study gives new insights on some aspect of the ore-forming events and discusses previous interpretations. According to our investigations, the ore settings were acquired during successive geological events related to an early hydrothermal-magmatic phase, likely of Permian age, and to the more recent Apenninic deformations. We suggest that the proto-ore was produced by hydrothermal activity related to the post-Variscan magmatic cycle (documented by the Permian age “Fornovolasco metarhyolite” Fm [2]), causing ore-formation, tourmalinization and hydrothermal alteration halo in the Cambrian-Lower Ordovician phyllites host-rocks. In our model, the ores were then partially exhumed suffering supergene alteration with development of minor Fe-oxides sedimentary mineralizations during the upper Norian-Hettangian. Finally, the previous hydrothermal and sedimentary ores, along with the host-rocks, were involved in the Apenninic orogenesis, and were recrystallized, and partially remobilized acquiring the current mineralogical, textural, and structural settings.

References:


Italy): New hints for the geological evolution of the basement of the Adria plate. Lithos, 318-319, 104-123.