

Au-porphyry deposits: a new perspective for Neogene volcanites of the Carpathian-Pannonian Region.

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Medium to high-K calc-alkaline Neogene volcanites of the Carpathian-Pannonian Region show a diverse compositional variation in response to a complex interplay of subduction with roll-back, slab break-off and back-arc extension as well as in response to further evolution of magmas in crustal environment. They host a number of mineralization types including well known LS/IS Au-Ag and base metal epithermal, Fe-skarn and porphyry/skarn Cu (\pm Au,Mo) deposits. A recent discovery of the Au-porphyry deposit Biely vrch in Slovakia extends the scale of economic deposit types and in that way opens a new perspective for the region. Resource estimate stands at 140.2 Mt geological resources (JORC inferred category) with average grade 0.57 g/t Au using 0.3 g/t cut-off [1]. Mineable mineral resource estimate totals 31.6 Mt at 0.8 g/t Au (www.emed-mining.com).

The deposit is located in the central zone of the large Javorie andesite stratovolcano along with earlier known poorly mineralized magmatic-hydrothermal systems of the HS type related to diorite/monsodiorite porphyry stocks. The deposit shares many properties characteristic of Au-porphyry deposits: very low Au/Cu ratio (<0.04 %Cu/ppm Au); high fineness of gold (875-994); a relationship to parental diorite/andesite porphyry stock; characteristic extensive intermediate argillic alteration that overprints earlier high-temperature K-silicate and Ca-Na silicate alterations in deeper levels; several generations of veinlets, including early Bt-Mag veinlets and widespread A-type and later banded Qtz veinlets [1, 2]. Fluid inclusions and oxygen isotope data point to a rapid fluid decompression associated with a shallow emplacement of the parental porphyry stock [3].

Subsequent exploration in the central zone of the Javorie stratovolcano resulted in discovery of other three sub-economic Au-porphyry occurrences. Several sub-economic and/or mineralogical occurrences have been discovered in other parts of the Central Slovakia Volcanic field, related to diorite/andesite porphyry stocks surrounding caldera of the extensive Štiavnica stratovolcano. The porphyry stocks along with alteration zones have been recognized during the earlier stage of geological mapping, however, their Au-porphyry potential at that time has not been recognized. It is highly probable that a similar situation exists in other parts of the Carpathian volcanic arc where eroded mature andesite stratovolcanoes host subvolcanic intrusive complexes with extensive zones of alteration. Geological setting and stream sediment anomalies of gold are the most effective exploration criteria on the regional scale. Magnetic anomalies in areas of extensive alteration, recognition of alteration pattern, careful float examination, lithogeochemistry and soil geochemistry are the most effective approaches on the local scale. An early involvement of special mineralogical methods is recommended to recognize the mineralization type.

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[1] Hanes, R. et al. (2010) *Mineralia Slovaca*, 42, 15-32. [2] Koděra, P. et al. (2010) *Mineralia Slovaca*, 42, 33-56.

[3] Koděra, P. et al. (2011) SGA 11, 2011, Antofagasta.