

WESTERN CARPATHIAN AND SELECTED EUROPEAN Sb-MINERALIZATIONS; Pb -ISOTOPE STUDY

ANDRÁŠ, P.¹, CHOVAN, M.², SCHROLL, E.³, NEIVA, A. M. R.⁴, KRÁL, J.⁵ & ZACHARIÁŠ, J.⁶

¹ Geological Institute, Slovak Academy of Sciences, Severná 5, SK-974 01 Banská Bystrica, Slovak Republic.

E-mail: andras@savbb.sk

² Department of Mineralogy and Petrology, Comenius University, Mlynská dolina G, SK-842 15 Bratislava, Slovak Republic.

³ Institute of Mineralogy and Crystallography, University of Vienna, Althanstrasse 14, A-1090 Vienna, Austria.

⁴ Departamento de Ciências da Terra, Universidade de Coimbra, P-3000 Coimbra, Portugal.

⁵ Slovak Geological Office - Geological Survey of Slovak Republic, Mlynská dolina 1, SK-817 04 Bratislava, Slovak Rep.

⁶ Institute of Geochemistry, Mineralogy and Mineral Resources, Faculty of Science, Charles University, Albertov 6, CZ-128 43 Praha 2, Czech Republic.

The Pb-isotope study of Sb-mineralizations from the **Western Carpathians** show a polycyclic character of the ore forming process.

Tatric Unit - the oldest model ages (corresponding to uranogenic lead) were determined in samples from the Nízke Tatry Mts (about 400 Ma). The second group of the data from this region vary between 300-330 Ma and the third one about 200 Ma (ANDRÁŠ *et al.*, 1998). The main field of the results from the Malé Karpaty Mts. is clustered round time-linea at 200-250 Ma (Pezinok deposit). The second group of the model ages is about 110-120 Ma (Pezinok and Pernek deposits). Kriváň occurrence (Vysoké Tatry Mts.) belongs to the last group (155-160 Ma). The Sb-mineralization from the Helcmanovce, Poproč and Grexa deposits (*Gemic Unit*) is connected with some younger events (110-140 Ma), including Permian volcanism. The special position (negative model age) have the samples from Zlatá Baňa neovolcanic deposit. The source of the lead from Sb-deposits of the Western Carpathians is not homogeneous and could be connected with the wall rocks. The lead is derived from crustal rocks, or related material.

Eastern Alps. The model ages calculated from the lead isotopes of stibnite from Schlaining (Penninic Rechnitz Window) deposit correspond with the young Alpidic age. The model ages of the other mineralizations can be interpreted as pre-Alpidic. The oldest model ages give stibnite from Drau range: Obertilliach (440 Ma), Radlbergalm (up to 385 Ma) and Rabant (360 Ma). The most important part of the results indicate model ages around 250 Ma. Data from Guginock (Drau range) and Brückl (Gurktal thrust system) indicate influences of younger events and ore-mobilization processes. The large spread of the data is partly due to the presence of young upper crustal Pb enriched in ²⁰⁶Pb and ²⁰⁸Pb in Variscan vein type deposits, partly also due to the addition of radiogenic Pb during remobilization of ores under metamorphic conditions of the Alpine orogenic process. The lead isotope data show the importance of the fluid mixing in the origin of the veins and suggest that the lead was leached from the wall rocks (ANDRÁŠ *et al.*, 1998).

The Pb model ages for the Sb-mineralizations of the **Bohemian Massif** coincide by and large with the assumed time

of ore formation during Variscan orogeny. The oldest model ages determined from Krásna Hora deposit (510-435 Ma). Pb-isotope data from Hynčice deposit correspond with Devonian age - 380 Ma and the sample from Příbram with Carboniferous (or Lower Permian?) age - 295 Ma. With the exception of the data from Krásna Hora deposit the samples indicate average crust origin of lead ($\mu_1 < 9.80$).

The oldest ²⁰⁶Pb/²⁰⁴Pb model ages both from Dúrico - Beirão district and from Trás-os-Montés (Galicia-Trás-os-Montés zone, **Northern Portugal**) correspond with Devonian age. They range from 405 (Alto do Subrido, Dúrico - Beirão district and Coitadinha-Grijó, Trás-os-Montés) up to 320 Ma (Alto do Subrido and Medas, Dúrico - Beirão district). The majority of the data is concentrated to the field bordered by values from 390 to 320 Ma (Alto do Subrido, Aguiar de Sousa-Abelheira, Moinho do Picão, Dúrico - Beirão district). Two samples: from Pinheirinhos and from Borralhal (both from Dúrico - Beirão district) show some younger mineralization formation about 245 Ma. One another sample from Borralhal gives model age at about 120 Ma (Cretaceous?) which represent the result of partial remobilization of the original mineralization.

The Pb in stibnite mineralizations is derived from homogenous crustal source. The lead gives μ_1 values between 9.66 and 10.04 which is higher than the average crust value (9.74). Only the μ_1 values from 2 samples (*from Grijó and from Medas*) are close to the upper crustal lead ($\mu_1 > 10$). In the Dúrico-Beirão district were the metals mobilized from metamorphic complexes during the regional metamorphism and during the intrusion of granitoides (304-280 Ma).

Data from Northern Portugal and from Bohemian Massif (in contradiction to Western Carpathian and Eastern Alpine area) present the features of the old Variscan terrains without significant younger Alpine overprint.

Reference

ANDRÁŠ, P., CHOVAN, M. & SCHROLL, E. (1998). Carpathian - Balkan Geological Association XVI Congress (Vienna), 4.