# The first Re-Os ages of auriferous sulfides from European Variscides

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We report Re-Os isotope ages of gold-bearing sulfides from the Radzimowice Au-As-Cu deposit in the Western Sudetes that are considered as a continuation of the Saxothuringian Zone of the European Variscides. The sheeted quartz-sulfide veins are related to Upper Carboniferous post-collisional potassic magmatism of the composite Zelezniak porphyry intrusion. The complex intrusive activity ranges from early calc-alkaline to sub-alkaline and alkaline rocks is followed by multiple hydrothermal events, with early mezothermal quartz, Co-arsenopyrite, pyrite and refractory gold overprinted by epithermal base-metal sulfides with carbonates, and late association of sulfosalts and telluride minerals with non-refractory gold. This deposit is considered as a transition between a porphyry and epithermal type [1].

Mineral separates of auriferous sulfides for Re-Os dating were made from samples collected from the underground workings of the *Luis* shaft and from the old mining wastes. Analyses of Co-arsenopyrites yields Re concentrations of 0.13-3.5 ppb with total Os in the ppt range. A six-point isochron based on four Co-arsenopyrite analyses plus one pyrite and chalcopyrite analyses gives an Re-Os age of 317 ± 17 Ma. The relatively large uncertainty is due to the very low Os concentrations of most of the samples (< 5 ppt total Os in all cases but one). Subtraction of blank contributions in such cases results in a significant adjustment to the $^{187}Os/^{188}Os$ ratio, with a commensurate increase in the uncertainties of both the isotopic composition and the concentration of Os in the samples [2]. Nevertheless, a model age of 317 Ma for one sample with a $^{187}Re/^{188}Os > 10^5$ is fairly insensitive to the assumed initial ratio and supports the isochron age.

A isochron Re-Os age of 317 ± 17 Ma suggests refractory gold mineralization during post-orogenic extension and regional uplift during a new continental break up started in Upper Carboniferous that followed post-collisional subduction related continental arc setting. (*This work is supported by NCSR, grant nr 5 T12B 001 22).*

## Refrences

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# Geochronological heterogeneity of porphyry rocks from the Triassic and Jurassic Cu-Mo deposits of Siberia and Mongolia

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Deciphering of the genetic features of porphyry magmatism is crucial to understand the conditions of origin of Cu-Mo ore-magmatic systems, their functioning and realization of their ore potential. Porphyry rocks of the Jurassic Zhireken and Triassic Kultuma Cu-Mo deposits (Eastern Transbaikalia) and Triassic Erdenetuin-Obo deposit (Northern Mongolia) consist of phenocrysts occupying up to 30-50 vol. % and fine-grained groundmass. Petrographic and $^{40}Ar/^{39}Ar$ age data (see Table 1) indicate the nonequilibrium state of phenocrysts.

Table 1. $^{40}Ar/^{39}Ar$ ages (Ma ± 2σ) of host granitoids and constituents of porphyry rocks – phenocrysts and groundmass.

| | Erdenetuin-Obo | Zhireken | Kultuma |
|---|---|---|---|
| Host granitoids | 258.6±3.3<br>247.2±3.7 | 168.1±1.9<br>178.7±1.7 | |
| Groundmass of porphyries | 240.8±1.0<br>240.7±0.8 | 158.0±0.4 | 133.4±0.3 |
| Feldspar phenocrysts | 245.7±0.7<br>247.1±0.8 | 164.2±0.4 | 141.1±0.9 |

Interpretation of the $^{40}Ar/^{39}Ar$ datings for phenocrysts and host groundmass is based on the low closing temperature of the K-Ar isotopic system in feldspars (<350°C). Datings for groundmass and phenocrysts will coincide in the case if the latter formed in porphyry melt (temperature > 850°C) and/or resided there a long time.

The difference between the $^{40}Ar/^{39}Ar$ datings obtained for phenocrysts and host groundmass may be explained by several reasons: 1) melt trapping of phenocrysts from wall rocks; 2) rapid uplift of porphyry melt; and 3) melt-quench at subsurface conditions where a porphyry stock is emplaced.

## Conclusion

At the Jurassic Zhireken and Kultuma and the Triassic Erdenetuin-Obo porphyry Cu-Mo deposits the ore-bearing porphyry stocks formed (in a geological time scale) rather quickly.

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