Goldschmidt 2000
September 3rd–8th, 2000
Oxford, UK.

Journal of Conference Abstracts
Volume 5(2), 428

Late Devonian Re-Os Age for Sulphides from Dergamish Massif Sulphide, South Ural, Russia

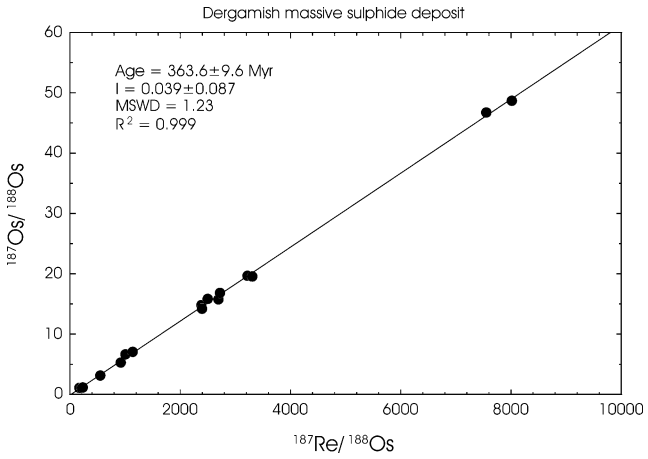
Abdelmouhcine Gannoun (gannoun@ipgp.jussieu.fr)[1], **Svetlana Tessalina**[2], **Jean-Jacques Orgeval** (orgeval@brgm.fr)[3], **Nikolaï Tatarko**[4], **Jean-Louis Birck** (birck@ipgp.jussieu.fr)[1] & **Claude-Jean Allègre** (zerbib@ipgp.jussieu.fr)[1]

[1] Laboratoire de Géochimie et cosmochimie, IPGP, 4, Place jussieu, Tour 14-24, 3E, 75252 Paris Cedex 05, France
[2] Institute of Mineralogy of Urals Branch, Russian Academy of Sciences, Miass, 456301, Russia
[3] BRGM, 3, Avenue C. Guillemin, BP 6009, Orléans Cedex 2, France
[4] Geological survey of Bashkortostan, 453640, Sibay, Russia

The Urals orogenic belt is one of the largest metallogenic provinces in the world separating the East European platform and the West Siberian plate. There are about 100 massive sulphide deposits, most of which occur in volcanic series or associated with altered ultramafic rocks. Four types of volcanogenic massif sulphides (Prokin et al., 1998) are recognized according to their formational position in the geodynamic environment (Cyprus, Urals, Baimak and Besshi type). The Dergamish deposit belongs to the Baygusarovskiy ophiolite complex of Sakmarsko-Khalilovsky group. The ore bodies are restricted to horizons of serpentinitic breccia. The general structure of the ore field is synclinal, and the sulphide bodies have a lenticular form. The sulphides mineralisation comprises chalcopyrite, marcasite, melnicovite, pyrite and pyrrhotite. Because of their siderophile and chalcophile behaviour, Rhenium and osmium (Re-Os) are often concentrated in sulphides. Consequently, this system can potentially be used to both directly date ore minerals and to trace their source composition by using the initial $^{187}Os/^{188}Os$ ratios of sulphides. In this study, Re and Os concentrations and Os isotopic compositions were determined for 12 massives sulphides from Dergamish Ore bodie.

Re and Os concentrations for all the samples ranges from 8.71 to 42.2ppb and from 0.06 to 0.6ppb respectively. $^{187}Re/^{188}Os$ ratios range from about 170 to 8015. This distribution is similar to that encountered in ores from Iberian pyrite belt (Mathur et al., 1999). The radiogenic Os (^{187}Os) represents between 12 and 87% of total Os content. The duplicate measurement of the same sulphides powders show the heterogenous distribution of both Re and Os. Model ages calculated for each sample range from 314 to 393 Myr. In Figure 1 $^{187}Re/^{188}Os$ vs. $^{187}Os/^{188}Os$, the twelve sulphides samples analysed yield an isochron with an age of 364±10 Ma and an initial $^{187}Os/^{188}Os$ ratio of 0.039±0.087 (MSWD = 1.23). These data show a relative coherence of the Re-Os isotope system through a complex post-mineralization history which may explain the residual scatter beyond the analytical error relative to the best fit line. Our isochron age is younger than the igneous crystallisation age of ophiolitic complex (Kempersai, Voykar Syninsky) from the South Urals (Edwards and Wasserburg, 1985). This age may correspond to the first stage of collision when the relict slab of the oceanic lithosphere was still being subducted.

The value of the initial $^{187}Os/^{188}Os$ ratio varies from 0.039±0.087 which is lower than expected for a crustal source and may therefore indicate a potential mantle origin for the Dergamish ore. This hypothesis is supported by the isotopic composition of lead (Ershov and Prokin, 1992) for another sulphide massif from the same locality (Ivanovka).



Fugure 1: Re-Os isotopic plots for samples from dergamish massive sulphide deposit (south Ural)

Prokin VA, Buslaev FP & Nasedkin AP, *Mineralium Deposita*, **34**, 121-126, (1998).

Mathur R, Ruiz J & Tornos F, *Mineralium Deposita*, **34**, 790-793, (1999).

Edwards RL & Wasserburg GJ, *Earth Planet. Sci. Lett.*, **72**, 389-404, (1985).

Ershov VM & Prokin VA, *Copper sulphide deposits of the Urals: conditions of ore formation In: Prokin VA (ed.)*, 211-220, (1992).