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Metallogeny of the Saryjaz ore district, Eastern Kyrgyzstan: Relationship with continental subduction and the Tarim mantle plume

Trifonov, B.A.[1] and Solomovich, L.I.[2]

[1]Russian Geological Research Institute, 74 Sredny Prospect, St. Petersburg 199106, Russia
Boris_Trifonov@vsegei.ru
[2]Kyrgyz Mining Institute, 215 Chuy Street, Bishkek 720001, Kyrgyzstan

The Saryjaz ore district is situated in the basin of the Saryjaz River in the Kokshal segment of the Late Paleozoic South Tien Shan collisional belt (STCB) [4]. The district is controlled by an areal of late-postcollisional Permian A_2-type granites [1, 2], which relate to the regional structure known as the Saryjaz syntaxis. The latter is characterized by bending of the southern boundary of the STCB and the maximum convergence of the Tarim and Kazakh Caledonian continents (Fig. 1). The ore district includes deposits: Trudovoye (126 Kt Sn, 88 Kt WO_3), Uchkoshkon (60 Kt Sn, 17 Kt Cu), Sarybulak (17 Kt Sn, 55 Kt Pb, 51 Kt Zn), Atjailau (1.3 Kt Sn) and Togolok (20 t Au). Outside the areal of Permian granite in an adjacent area of the Middle Tien Shan, a part of the Caledonian Kazakh continent, is located the giant Kumtor gold deposit (516 t Au, 273 t Ag, 39 Kt WO_3).

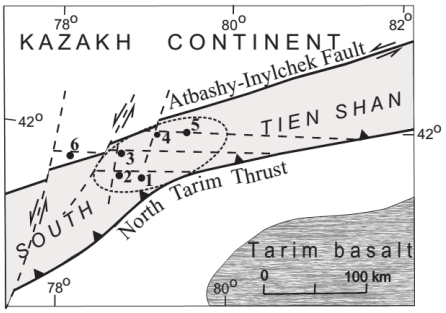

Figure 1: Regional position of the Saryjaz ore district

Areal of postcollisional granites of the Saryjaz ore district

Transcurrent shear zones

3 Ore deposits: 1- Togolok (Au); 2- Sarybulak (Sn,Pb,Zn); 3- Uchkoshkon (Sn,Mo,W); 4- Trudovoe (Sn,W); 5 - Atjailau (Sn,W); 6- Kumtor (Au,Te,W)

Formation of fold-thrusting structures in the Kokshal segment of the STCB, thickening the crust to 60-65 km, was completed in the Late Carboniferous by the continental subduction of the Tarim under the Caledonian Kazakh continent [3]. On the basis of petrology, geochemistry and metallogenic specialization, ore-bearing granites are subdivided into two series [2, 4]: 1 – Rapakivi granite of the Jangart complex; 2 – leucogranite of the Uchkoskon and Inylchek complexes. The Rapakivi granite (296-292 Ma) [1] is older than the Tarim plume basalt (290-275 Ma) [5]. They were formed during late-postcollisional exhumation and melting of overheated slabs of the Tarim craton that were previously subducted into the mantle [3]. Formation of the postcollisional leucogranite complexes (296-269 Ma)

[1, 2] occurred under complicated conditions of the interaction of the Rapakivi magma fractionation with further melting of the crust under the influence of the Tarim mantle plume. The latter is characterized by two peaks of Permian igneous activity [5] - 290 Ma (the early phase) and 275 Ma (the main phase). Ultimately, the evolution of the leucogranite magma in the Saryjaz ore district was accompanied by the formation of isolated magmatic chambers with ultra-rare-metal ongonite (Li-F) and elvan (B-F) magmas [4].

Late-postcollisional sinistral strike-slip tectonics, caused by oblique collision between the Tarim and Kazakh continent led to the formation of a regional system of transcurrent shear zones [2, 4]. These shear zones controlled the distribution of heat and fluid flows, granite localization, and ore mineralization in the consolidated crust. Considerable gold mineralization (Togolok deposit) and small manifestations of Sn-W mineralization are localized in the lower thrust sheets of the STCB in association with the Rapakivi granite. Large Sn-W deposits are associated with the leucogranite as follows: Uchkoshkon and Sarybulak in the middle thrust sheets of the STCB in association with the Uchkoskon complex; Trudovoe and Atjailau in the upper thrust sheets in association with the Inylchek complex. Axial transcurrent shear zones controlling large batholite-like granite plutons of the Uchkoshkon and Jangart complexes in the Saryjaz ore district have continued westward beyond the STCB where they control the location of the giant Kumtor gold deposit (288-284 Ma).

References:

[1] Konopelko D et al. (2007) Lithos 97: 140-160

[2] Solomovich L and Trifonov B (2002) Asian Earth Sci. 21: 7-21

[3] Solomovich L and Trifonov B (2014) Asian Earth Sci. 96: 332-343

[4] Trifonov B and Solomovich L (1993) Geol. Ore Deposits 35: 44-52 (in Russian)

[5] Zhang C-L and Zou H-B (2013) Lithos 172-173: 47-60