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The 12.5 Moz Au Sergeevsko-Klyuchevskoe IRGS Cluster (Transbaikalia, Russia) and Yanshanian Gold Metallogeny

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The Sergeevsko-Klyuchevskoe cluster of gold deposits, containing about 390 t Au and grading 1.3-1.5 g/t Au, is the tenth largest hardrock gold endowment in Russia and is one of the world's largest intrusion-related gold deposits. The cluster is part of the 1,400 t Au Mogocha district (Transbaikalia, Russia).

The Sergeevsko-Klyuchevskoe stockwork (3 x 0.7 km) extends west-east, being structurally controlled by the dextral extensional duplex (Fig. 1A). Disseminated sulfides and quartz-tourmaline veins within an alteration envelope are found in Permian and Late Jurassic intrusive rocks. The latter consists of seven magmatic phases, some of which are genetically related to Au-(Mo) mineralization.

The Au mineralization of Transbaikalia associates with Mo-(Cu). Traditionally, the metallogenic belts are interpreted to be controlled by the Mongol-Okhotsk suture, formed at the end of the Middle Jurassic (~162 Ma) after collision between the southeastern edge of the Siberian craton and the Argun and Bureya terranes of the Central Asian orogenic supercollage, generally coinciding with the area of Late Jurassic igneous rocks. However, gold-bearing deposits of different types (intrusion-related, epithermal, and porphyry), but close in age (159-143 Ma), are grouped along transverse mineral trends striking across the suture (Fig. 1B). This indicates post-collisional timing of mineralization.

These Transbaikalian metallogenic belts occur on the northern periphery of the Yanshanian metallogenic province, occupying an area of 4,500 x 3,300 km, mostly in eastern China (Fig. 1B). The individual belts of this province are controlled by magmatic arcs and giant faults, stretching for thousands of kilometers parallel to the Pacific coast. The displacement along the faults reaches hundreds of kilometers. They are kinematically related to the northward collision between the Yangtze craton up to the southern periphery of the Siberian craton, part of overall northward translation along the western Pacific margin.

Figure 1: (A) Geology of the Sergeevsko-Klyuchevskoe gold cluster and (B) its position in the Yanshanian areal gold province of eastern Asia. Note control of giant sinistral strike-slip faults.

