

Mercury as pathfinder in geochemical exploration of hydrothermal gold-silver deposits in Kamchatka

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The investigation of mercury distribution in lithochemical dissipation flows, rocks and soils of hydrothermal Au-Ag deposits (Sergeevsky, Ametistovy, Ozernovsky, Rodnikov, Mutnovsky, Asachinsky and Zolotoe) in Kamchatka shows that mercury is an excellent indicator for locating ore zones of this type. Mercury haloes accompany all known and studied ore deposits, and are informative if the depth of erosion and thickness of loose materials are small. These conditions predominate in most of Kamchatka.

Ore zones are veins varying from 0.5 to 20–30 metres wide extending over distances from 0.1 to 2–3 kms, and occur in volcanic rocks of Neogene-Quaternary age. Two mineral complexes (low- or high-sulphide) dominate ore composition with native gold present in both kinds. Adjacent rock alteration (propylitisation, argillisation, silicification, sericitisation) accompanies the ore bodies. The Sergeevsky ore deposit lies north of the Kamchatka isthmus in the Penzhinsky metallogenic province. Since reserves of gold in this deposit are known to be small and that is also true of the associated mercury halo, it is suggested that their size is linked.

The Ametistovy deposit in the Central-Koryak

metallogenic province shows local and contrasting Hg haloes which delineate the ore outcrops. Narrow haloes correlate well with the relatively deep erosion of the ore zone and the primary dispersion haloes of Cu, Pb, Zn and Ag. The broad and contrasting Hg halo in lithochemical dissipation flows and which is accompanied by Ag haloes several kilometres from the known deposit suggest the existence of another ore deposit at present hidden but probably big enough to be exploitable.

The Ozernovsky, Rodnikov, Asachinsky and Mutnovsky deposits are located in the young active East Kamchatka volcanic belt. The small Rodnikov deposit displays very localised Hg haloes in keeping with the hypotheses of limited reserves of Au and Ag, recent age, and localised ore formation.

The Mutnovsky Au-Ag deposit is of greatest interest. The present ore zone outcrop is marked by a very narrow, sharp and contrasting primary Hg halo, but several extensive Hg haloes were also identified near this zone, and one of them crosses the known ore zone. We suggest that at least some of these haloes reflect projections of unknown ore zones not yet exposed by erosion.