Mantle-derived In mineralization in the Erzgebirge and Kuril Island Arc

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Indium-enriched, late Variscan Permo-Carboniferous pneumatolytic and hydrothermal Zn-Sn(-Cu) greisen- and skarn-type and Zn-Sn-Cu-Pb(-Ag-Au) base metal sulfide vein- and vein-like stockwerk metasomatic zone-type mineralization in the Erzgebirge-Krušné hory (D, CZ) metallogenic province (e.g., Geyer, Pöhla, Freiberg, Marienberg) show spatial and temporal relationships to postcollisional (post-type Eibenstock granite) Li-F small intrusion granites/rhyolites and mantle-derived lamprophyres [1] [2]. The emplacement of fluid-enriched lamprophyric and F-rich rhyolitic intrusions at the same time is probably associated with decompression melting of updoming asthenosphere which is possibly associated with a mantle plume [1] [3] [4]. Fe-rich sphalerite with typical chalcopyrite-diseases and near chondritic $\delta^{34}S$ is the main host mineral of high In and Cd concentration (up to 1 wt.% In, up to 0.8 wt.% Cd) [2] [5]. High-T fluid inclusions in associated cassiterite (T_H up to 690°C) and quartz (T_H up to 500°C) indicate also a link to mantle-derived fluids [5] [6].

Rare metal-rich fumarolic fluids of the Kudryavy andesite-basalt volcano (Kuril Island Arc, Russia) with a maximum temperature of 870°C deposit subduction melt-derived mineralization with Cd-In sulfides [7], Pb-Bi sulfosalts enriched in Sn and In [8] and Cd-Pb-Bi sulfosalts [9]. Indium contents of gas condensates from stationary degassing Kudriavy volcano (Kuriles) ranges from 3 to 50 ppb (400–870°C), while it reaches 112 ppb in 900°C gas at post-eruptive degassing on Gorely volcano (Kamchatka) [10] and 202 ppb in 1030°C magmatic gas condensates from basaltic melt at 2012–13 Tolbachik eruption (Kamchatka).

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