

Cassiterite LA-ICP-MS U-Pb Geochronology of Greisen- and Vein-Hosted Sn Mineralization in the Eastern Erzgebirge (Germany/Czech Republic)

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Various types of polymetallic magmatic-hydrothermal deposits are present in the eastern part of the Erzgebirge, located across the eastern part of Germany and the northwestern part of Czech Republic. Most of these deposits are greisen- and vein-type deposits that are well-endowed in Sn, Li, and W and spatially associated with the Altenberg-Teplice caldera. However, only a few of those deposits have been reliably age dated (e.g., Sadisdorf district), leaving the timing of hydrothermal mineralization on the regional scale widely unconstrained.

Here, we report new U-Pb LA-ICP-MS ages of cassiterite from Li-Sn-(W) mineralization at Zinnwald, Altenberg, Niederpöbel, Schmiedeberg, Bärenfels, Lauenstein and Krupka. The new ages of the different localities span between 317.7 ± 3.8 and 306.6 ± 3.5 Ma, with a majority of the ages comprised between 315 and 309 Ma. Greisen- and vein-hosted cassiterite ages constrain the timing of hydrothermal mineralization, on a regional scale, to a narrow time window of ~10 Ma years and are significantly younger than previously proposed ages (325-318 Ma). The new ages are consistent with recent zircon ages of (sub-)volcanic rhyolite units (315-313 Ma), which are the host rocks of some of the Li-Sn-(W) granites. Greisen formation and associated cassiterite crystallization thus temporally coincides with the formation of the 315 to 310 Ma ring dikes linked to the collapse of the Altenberg-Teplice caldera.