# Implications on the timing of ore-formation of Sb vein-type mineralization of the Berga Antiform, Germany

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The antimoniferous vein-mineralization in the Schleiz and Greiz area, eastern Thuringia, are bound to NE-SW striking Variscan faults zones along the margins of the Berga antiform. The Sb-Pb-Zn ores form massive sulfide-quartz±carbonate veins, breccias or stockworks hosted by Ordovician and Silurian metasedimentary units, Devonian metabasalts and metagranitoids. Minerals of the Sb-Pb-Zn-sulfide assemblage replace an earlier Fe-As-Zn-sulfide-quartz assemblage (ore-stage I). Stibnite and quartz II overgrow these early sulfides accounting for the ore-stage II. Lead-dominated Sb-sulfides (e.g., zinkenite, plagionite, semseyite) represent the ore-stage III phase followed by boulangerite, galena, sphalerite II, and quartz III accounting for ore-stage IV.

The ore-bearing fluids migrated along deep-reaching major fault structures into a shallow (< 2 km), low temperature environment. Major NE-SW trending fault structures that steeply dip towards the northwest controlled migration, finally bringing the fluids (under rapid ascent) to the site of ore deposition where they formed massive sulfide-quartz ± carbonate veins or breccias within Ordovician, Silurian and subordinately Devonian host rocks. In-situ U/Pb age data on carbonates (siderite, ankerite), co-genetic to the hydrothermal Sb-Pb-Zn assemblages (ore-stages II, III and IV), shows a timing of mineralization in the early Permian at 289.7 ± 7.6 Ma. Reactivation of the fault systems occurred in the Triassic (~ 238 Ma), the Jurassic (~ 160 Ma) and the Paleogene (~ 35 Ma), but did not initiate further mineralization. The close spatial relationship to magmatic activity of the early Permian were not yet reported for this type of Sb mineralization in the Variscides and older assumptions of a metamorphic genesis can thus be ruled out. The advantages of spatially resolved LA-ICP-MS analyses in deciphering direct mineralization ages in hydrothermal vein-type deposits may be used to reevaluate former age constraints in the Variscides.