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## Distribution of heavy metals in waters and stream sediments

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[1] At the time of digital provision, the authors mentioned are no longer active in the BGR for reasons of age. The digital processing was carried out by U. Rauch, Bundesanstalt für Geowissenschaften und Rohstoffe, Dienstbereich Berlin, Wilhelmstraße 25-30, D-13593 Berlin, Email: uwe.rauch@bgr.de, geochemischeatlanten@bgr.de.

[2] The addresses were updated to the status of the year 2022.

### 2.3.2.15 Tin in stream sediments

Tin analysis is not only very involved but also expensive. For this reason, a systematic determination of tin in stream sediments was carried out only for certain areas.

The tin concentrations range between 1 ppm (detection limit) and 1900 ppm; 85 % of all the samples contain less than 4 ppm Sn.

Tin mineralization is associated with the late differentiates of silica-rich igneous rocks (granite, rhyolite) and tin deposits are formed particularly in the pneumatolytic (300 - 500°C) and hydrothermal (250 - 350°C) stages.

The most important tin mineral is cassiterite ($SnO_2$), although other tin-bearing oxides and sulphides exist. A few other minerals can contain considerable amounts of tin: zinnwaldite and muscovite up to 3500 ppm, biotite up to 1300 ppm, and amphibole and sphene up to 1100 ppm Sn.

Cassiterite is chemically stable and very resistant to weathering and thus occurs as a heavy mineral in stream sediments.

High concentrations of tin in stream sediments are found predominantly in the areas of crystalline rocks in the Black Forest and the Fichtelgebirge and less commonly in the Upper Palatinate and Bavarian Forests. They can locally be shown to be associated with known tin occurrences.

Tin was once mined near Weissenstadt in the Fichtelgebirge, concentrated mainly on placer tin, although primary (postmagmatic) tin ores were also worked. In the Black Forest, cassiterite has been found in the Triberg and Eisenbach granites.

The remaining four anomalies (over 200 ppm Sn), which are probably of anthropogenic origin, are located south of the Ruhr near Iserlohn (1900 ppm Sn), north of Koblenz, in the Hunsrück and west of Bad Tölz.