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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[1] At the time of digital provision, the authors mentioned are no longer active in the BGR for reasons of age.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.

2.3.2.5 Copper in stream sediments

The copper concentrations range between 5 ppm (detection limit) and 2560 ppm with a median (50 percentile) of 9 ppm.

Extensive areas show concentrations of less than 10 ppm. There are also areas of anomalously high Cu values. These anomalies coincide with old mining districts in which the high Cu values are of geological origin, and with zones in which copper has been introduced by man's activities.

The Harz Mountains, where the maximum Cu concentration in the stream sediments is 1500 ppm, stand out conspicuously from their surroundings. The source of the copper is the Rammelsberg deposit near Goslar and other smaller deposits and old smelters.

High copper values also occur in the Rhenish Schiefergebirge, where numerous ore lodes (particularly in Siegerland, in the Dill depression, and near Bensberg) have yielded copper as a by-product.

Other known copper mineralizations also show up in the data, for example, near Marsberg, Sontra, Bieber, Kupferberg (Frankenwald), Fischbach, Bodenmais, and Donnersberg.

The high copper values for the stream sediments in the German grape- and hop-growing areas are due to the use of pesticides. Especially prominant are areas in Rhine Hesse, Rhine Palatinate, and Hallertau.

The other copper anomalies are probably also due to anthropogenic contamination, e.g. near Hamburg, Teublitz-Maxhütte, and Hanau.

Copper is one of the essential trace elements for living organisms. There are many metabolic control mechanisms for preventing damage caused by concentrations that are too high or too low. For this reason, cases of copper poisoning or deficiency seldom occur.

In 0.01 % of the analysed stream sediments samples, there were copper concentrations above the limit of 1200 ppm given in the sewage sludge regulations (Bundesgesetzblatt, 1982[1]).

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[1] Bundesgesetzblatt (1982): Klärschlammverordnung - AbfKlärV. Bundesgesetzblatt, Teil 1, S. 734ff. vom 25. 6. 1982; Bonn.