

Excerpt from

Geochemical

ATLAS

**Federal Republic
of Germany**

Distribution of heavy metals
in waters and stream sediments

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Sampling

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¹ At the time of digital provision, the authors mentioned are no longer active in the BGR for reasons of age.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, geochemischeatlan-ten@bgr.de.

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

1.5 Presentation of the results

The data obtained during the multielement geochemical survey of the Federal Republic of Germany are represented on 1 : 2,000,000 maps using a 1.5 mm grid and, in general, six colours¹. This means that

- depending on the sampling density, there are up to 20 samples in each grid square (9 km² each) for which the arithmetic mean and the maximum value are shown;
- the results have to be grouped so that they can be represented with six colours (pH and conductivity with ten colours). Areas in which no samples were taken are left white.

For the grouping of the measured values, the two class boundaries (85 and 95 percentiles) above the 50 percentile value, i.e. median, were chosen in such a way that each roughly represents one standard deviation. Since the values above these limits are defined as anomalous, the next two class boundaries (99.0 and 99.9 percentiles) are closer together in order to achieve better resolution of the results in this critical range. However, if, as with some elements, a high percentage of the values were below the analytical detection limit, then the lowest class boundary was moved up one class. In spite of this, when rounded numbers were used (e.g. 1, 5, or 10), spurious groupings may appear even well above the detection limit due to a lack of precision; these may cause serious distortion in the histograms and cumulative frequency curves.

For the representation of the maximum values, colours are combined with columns drawn in 3 dimensions, the lengths of which are proportional to the size of the corresponding maximum value. The longest column on each map corresponds to the maximum value given in the legend for that map. The 3-dimensional representation causes a certain amount of distortion of the map; the scale is there-fore not altogether true².

¹ The distribution of the element contents is presented in the digital version of the Geochemical Atlas of the Federal Republic of Germany in each case in a map produced according to the calculation method described in this chapter. In addition, colour shaded contour maps are provided that were generated using newer interpolation methods (Kriging). These are available firstly in the class boundaries of the map from the 1985 paper edition of the atlas and secondly in a map with a variable colour gradient scale of 72 classes, in the latter of which the shades of green approximate the geochemical background. In addition, two point maps are offered, which show the element contents at the sample point in the class boundaries of the original map from the paper edition of 1985 and in the class boundaries of the 72 class map with variable colour gradient scale.

All maps can be downloaded from the BGR product centre (<https://produktcenter.bgr.de>) at a scale of 1 : 2,000,000 including a background topography in PDF and PNG formats with a resolution of either 300 or 600 dpi. Simultaneously, they are also available for download as ESRI shape files. Furthermore, all maps can be integrated into own GIS projects via WMS (Web Map Services) provided by the BGR or visualised with the BGR Geoviewer (<https://geoviewer.bgr.de>) in most common browsers.

² The calculation of the maximum values of the grid cells as well as their three-dimensional columnar representation has been omitted in the digital edition. They were replaced by point maps of the individual values, from which the maximum values are also recognisable.

The practical use of the Atlas is subject to certain limitations resulting from the two different forms of representation, since the first is based on the mean values of a variable number of samples and in the second, the location of the maximum values on the map is relatively inaccurate. However, for each element, the same grid was used in both forms of representation so that a given arithmetic mean and the corresponding maximum value fall on the same grid square. Two transparent overlays are provided in the Appendix with a key to the 1 : 25,000 topographic sheets and showing towns and villages of significance for this work¹.

The colour models for the printing plates were prepared on an Applicon colour plotter using the UNIRAS program package on a Siemens 7.741 computer².

¹ These overlays are not included in the digital edition. However, the downloadable maps in PDF and PNG format are backed with much higher resolution topography.

² The maps included in the digital version of the atlas were produced using Golden Software® Surfer® to calculate the grids and ESRI ArcGIS® to generate the downloadable shapes and maps.