

## 6. Summary

The present report describes a first attempt to determine pollution with metals throughout the Federal Republic of Germany by analysing moss samples. Samples of *Pleurozium schreberi*, *Scleropodium purum*, *Hypnum cupressiforme* und *Hylocomium splendens* were collected at 593 points and analysed by ICP-AES and AAS for the elements As, Cd, Cr, Cu, Fe, Ni, Pb, Ti, V and Zn.

Citrus leaves and pine needles were used as reference materials to ensure the quality of the results, and in general a good level of correspondence was found. The reproducibility of the decomposition method was ascertained by decomposing 51 pairs of samples. The mean relative standard deviations ranged from 7.7 % (Zn) to 25.6 % (Ni). The element concentrations in moss species taken from the same sampling points and analysed on a parallel basis fluctuated between 12.3 % and 67.4 % (Ti).

Within the area covered by the survey, wide variations in concentration ranging from 222 % for zinc to 966 % for titanium were found; these are many times greater than the fluctuations resulting from the method or the species and are therefore evidence of the differences in pollutant load. In many cases it was possible to trace the areas affected by known sources of heavy-metal emissions in addition to isolated local increases in the values. The moss monitoring programme showed up the highly industrialized and urban locations such as the Ruhr, parts of the Saarland and Baden-Württemberg and large areas of eastern Germany. Lower levels of many elements were found in wide stretches of Lower Saxony and Bavaria.

The results largely reflected the pollution pattern found in these areas. On the other hand, expected correlations between the effects of traffic (e.g. Pb) and concentrations in moss could not be demonstrated with certainty.

The element data yielded by this project are German`s contribution to the European project "Atmospheric Heavy Metal Deposition in Europe - estimations based on moss analysis".

The report will provide a basis for further investigations which it is planned to repeat at five-year intervals. Moss monitoring makes it possible to demonstrate regional differences in pollution levels and recognize long-term developments at relatively low costs.