

Validation of chemical analyses of atmospheric deposition in forested European sites

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ABSTRACT

Within the activities of the Integrated Co-operative Programme on Assessment and Monitoring of Air Pollution Effects on Forests (ICP Forests) and of the EU Regulation 2152/2003, a Working Group on Quality Assurance/Quality Control of analyses has been created to assist the participating laboratories in the analysis of atmospheric deposition, soil and soil solution, and leaves/needles. As part of the activity of the WG, this study is a statistical analysis in the field of water analysis of chemical concentrations and relationships between ions, and between conductivity and ions for different types of samples (bulk or wet-only samples, throughfall, stemflow) considered in forest studies. About 5000 analyses from seven laboratories were used to establish relationships representative of different European geographic and climatic situations, from northern Finland to southern Italy. Statistically significant differences between the relationships obtained from different types of solutions, interacting with different types of vegetation (throughfall and stemflow samples, broad-leaved trees and conifers) and with varying influence of marine salt were tested. The ultimate aim is to establish general relationships between ions, and between conductivity and ions, with relative confidence limits, which can be used as a comparison with those established in single laboratories. The use of such techniques is strongly encouraged in the ICPF laboratories to validate single chemical analyses, to be performed when it is still possible to replicate the analysis, and as a general overview of the whole set of analyses, to obtain an indication of the laboratory performance on a long-term basis.

Key words: atmospheric deposition, ion concentrations, conductivity, data validation
