

The trace element composition of stream- and melt-waters at times of the spring-thaw in the Scottish Highlands.

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ABSTRACT

Fresh snow and streamwater samples were collected on a daily basis throughout the winter and spring periods of 1984 and 1985 at a remote, upland catchment located within the Cairngorm Mountains, Scotland. Laboratory based partial-melt experiments undertaken on the snow samples demonstrated that both fractionation and preferential elution of trace-elements occur during melting, with the concentrations being 1.3 to 5.4 times greater than in the first 10 percent meltwater fractions than in the bulk snow (Abrahams *et al.*, in press). At the onset of snowpack melting, the ions may be mobilised and redistributed within the snow profile, concentrating at depths from where they may be quickly removed during the early spring run-off. The raised major- (Ca, Mg, Na, Cl, NO₃ and SO₄) and trace-element (Al, Cd, Cu, Fe, Mn and Pb) concentrations recorded in the streamwaters during the "acid-flush" episodes at the time of the first major periods of snow-melt, reflect both the meltwater composition and the influence of the catchment soils (Abrahams *et al.*, submitted for publication). Differences in streamwater chemistry during the two periods of snow-melt which were studied can probably be related to the fact that snow-melt occurs under a variety of circumstances with significant variations in the sequence of precipitation, melt-events, temperature and snowcover occurring from year to year, even in the same catchment. The high concentrations of Al (up to 330 µg L⁻¹) in the streamwaters at the time of snow-melt, probably reflect leaching of this element from the soil. These elevated concentrations, in combination with other streamwater parameters, may prove toxic to aquatic life-forms at this time of year.

REFERENCES

- Abrahams, P.W., Tranter M., Davies, T.D., Blackwood, I.L. and Landsberger, S. (in press). Trace-element studies in a remote Scottish upland catchment. I. Chemical composition of snow and meltwaters. *Water, Air and Soil Pollution*.
- Abrahams, P.W., Tranter M., Davies, T.D. and Blackwood, I.L. Trace-element studies in a remote Scottish upland catchment. II. Streamwater chemistry during snow-melt. *Water, Air and Soil Pollution*.

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(The conference paper was based on the two papers cited as references above, to which the reader is referred.)

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ERRATUM

In the report "Inorganic element uptake by barley from soil supplemented with flue-gas desulphurisation waste and fly-ash" by Gunnar Gissel-Niesel and Finn Bertelsen, 1988. *Environmental Geochemistry and Health* 10(1), 21-25, the following errors occurred: Page 23, Figure 1: The legend is correct but the figure is in Figure 2, Page 24, Figure 2: The figure is in Figure 1. In the legend, the symbol ■ is incorrectly placed following 1). The correct version is: 3) FGD-product ■ .