High levels of ^{129}I in rivers of south Sweden

A. Kekli[1], M. Meili[2], A. Aldahan[1], G. Possnert[3] & N. Buraglio[3]

[1] Department of Earth Sciences, Uppsala University, S-752 36 Uppsala, Sweden
[2] Institute of Applied Environmental Research, Stockholm University, S-106 91 Stockholm, Sweden
[3] Tandem Laboratory, Uppsala University, S-751 21 Uppsala, Sweden

Abstract

The concentration of iodine-129 was measured in water samples collected during summer 1999 from ten rivers located in southern Sweden. The results show ^{129}I concentrations ranging from $4x10^8$ to $1.4x10^9$ atoms per liter. This range is comparable to that observed in lake and river waters of central Sweden, but includes some of the highest values ever recorded in low-salinity freshwaters without direct discharge of ^{129}I from a nuclear installation. The globally most important source of ^{129}I is presently the discharges (marine and atmospheric) from the nuclear reprocessing facilities at La Hague (France) and Sellafield (UK). The marine discharges from these facilities have increased the level of ^{129}I in the North Sea by about 5 orders of magnitude above natural background. Our study indicates a similar increase also in remote European freshwaters, although concentrations are about 2 orders of magnitude lower than those in the North Sea. The data suggest a substantial atmospheric deposition of ^{129}I discharged from reprocessing facilities, which is supported by recent precipitation measurements in central Sweden. Furthermore, it appears that recent deposition is already evident in runoff waters. This opens the question of whether and when concentrations of ^{129}I in Nordic freshwaters will increase to levels comparable to those presently encountered in the North Sea.