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Iodine-129 and iodine-127 in soils from Germany

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The environmental abundance of 129I has been changed substantially, mainly as a consequence of the 129I releases from European reprocessing plants [1, 2]. Iodine from wet and dry deposition is accumulated in soils, transported by surface waters, infiltrates groundwater, and makes its way through the biosphere. One of the goals of this project is to investigate the inventories of 129I and 127I in the pedosphere in Germany.
Stable iodine is analysed by using inductivity coupled plasma mass spectrometry (ICP-MS). The 129I /127I ratio is determined by means of accelerator mass spectrometry (AMS).
Sampling of different soil types at various locations in Germany, down to a depth of 50 cm, is in progress. The samples are taken from 0-5 cm, 5-10 cm, 10-20 cm, 20-30 cm, and 30-50 cm, resp.
The 129I inventories of the first soils analysed range from 120 mBq m-2 to 470 mBq m-2 (depth: 50 cm), with the higher values being found in the northern and western parts of Germany. The profiles show a characteristic distribution of the 129I /127I ratios, with the highest values in the organic rich topsoil layer and a distinctive decrease of the values with increasing depth. This indicates that anthropogenic 129I is strongly associated to soil organic matter, and is released again in a very slow process.

[1] M.J.M. Wagner, B. Dittrich-Hannen, H.-A. Synal, M. Suter, U. Schotterer (1996), Nucl. Instr. Meth. Phys. Res. B 113, 490-494.
[2] A. Aldahan, V. Alfimov G. Possnert (2007), Appl. Geochem. 22, 606–618.

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