A larger positive δ^{53}Cr shift from pollution source to groundwater at Czech industrial sites, compared to the northeastern U. S.

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In polluted aquifers, spontaneous reduction of toxic, soluble Cr(VI) to largely insoluble, non-toxic Cr (III) may occur, depending on the availability of reductive agents. The reduction of Cr(VI) is associated with an isotope fractionation, with the product, Cr(III), becoming isotopically lighter. Seven industrial sites in the Czech Republic (Central Europe) and one in the northeastern U.S. were selected to study possible self-attenuation of Cr-polluted groundwaters. Cr-rich groundwaters at five Czech sites originated from electroplating (Loucna nad Desnou, Zlate Hory, Letnany, Site B, and Bruntal). Chromium pollution at site Trutnov was caused by leather processing, at site Hradek nad Nisou resulted from production of Cr(III) salts. At the eighth study site (confidential upon request by owner; Connecticut, U.S.A.), Cr from electroplating was released to the environment in a dissolved form, but also by washdown of deposited aerosols. Direct sampling of the Cr in the industrial operations showed that δ^{53}Cr(VI) of the pollution source was low, < 1 ‰ [1]. δ^{53}Cr(VI) of the groundwaters was nearly always higher than the pollution source. At the Czech sites, δ^{53}Cr(VI) of the groundwaters ranged between 0.5 and 6.0 ‰, peaking at about 3 ‰. In contrast, at the U.S. site, δ^{53}Cr(VI) of the groundwaters was lower, ranging between 0.5 and 2.5 ‰. It appears that spontaneous removal of the toxic form of Cr from the groundwaters was under way in both countries. Higher δ^{53}Cr values of the residual Cr(VI) in Czech groundwaters may indicate a greater degree of Cr(VI) reduction, compared to the U.S. site.

[1] Novak M. *et al*. (2014) *Environ Sci Technol*. **48**, 11, 6089-6096.