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Chromium depletion in a *Sphagnum*-peat core and related humic acids.

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Peat is a blond to black organic material ($<$ 25 % by weight mineral matter) formed under waterlogged conditions from the partial decomposition of mosses and other bryophytes, sedges, grasses, shrubs, or trees.

A peat core (2T, 15 x 15 x 105 cm) was removed in 2005 from a Swiss ombrotrophic bog and divided in several (n = 91) slices of 1$\pm$0.15 cm of thickness. Twenty-three peat samples were manually shaken with high purity water and sieved obtaining a "fibric" (i.e. undecomposed or little decomposed material, ø $>$ 2 mm) and a "sapric" (ø $<$ 2 mm) fraction; in addition, humic acids (HA) were extracted. Raw peat, fibric and sapric fractions, and related HA were analyzed using an Energy-dispersive miniprobe X-ray fluorescence multielement analysis (EMMA-XRF). In addition, an enrichment factor (EF) was calculated normalizing the Cr content to the Ti one known to be derived mainly from crustal weathering.

Data show that: i) a depletion of Cr occurs along the studied peat profile, with the exception of the section between 15 and 27 cm in which the EF $>$ 1 probably underlines a change in Cr fall out occurred between 1936 and 1970 (^{210}Pb age dating); *ii*) Cr is not retained by *Sphagnum* tissues (i.e. fibric peat); and *iii*) Cr is not preferentially bound to HA (average Cr_{HA}/Cr_{peat} = 0.65), even if it shows a similar trend compared to the raw peat one.

Thus, in the studied profile, characterized by 95% of organic matter, pH $\sim$ 4, and oxic to anoxic conditions, Cr seems to form outer-sphere complexes with the organic ligands and to be easily leached downward.