Bromine, iodine and uranium as the proxies of past biological activity in the lacustrine sediment core

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Bromine (Br), iodine (I) and uranium (U) in Lake Baikal sediment core (VER99G12) which spans over the last 30,000 years were analyzed with polarrizing energy dispersive X-ray fluorescence spectrometery (EDXRF, Epsillon 5, PANalytical, The Netherland). EDXRF with pressed powder pellet has been recognized as the simple and reliable measurements for determination of Br and I concentrations in soil samples [1].

The concentrations of Br, I and U ranged from 0.88 to 20 mg/kg, from 4.3 to 50 mg/kg, and from 3.3 to 20 mg/kg, respectively. The depth profiles of Br and I showed the gradual increases toward the top of the core from the last glacial to the Holocene, corresponding with the increase in TOC of VER99G12 sediment core. The significant correlations between Br and total organic carbon (TOC, r = 0.892), and I and TOC (r = 0.720) were observed. These results mean that the Br and I in the lake sediment core are basically associated with organic matter. As well as Br and I, high correlation coefficiency were also found between U and TOC through the core (r = 0.789). Additionally, the temporal decerases in the concentrations of these elements were also found at the Younger Dyras period (11,500 cal BP). Our results suggest that Br, I and U in the lacustrine sediment core can be used as the proxy for the past biological activity in the lake water column.

[1] Takeda A., et al., *Soil Sci. Plant Nutr.*, **57**, 19–28. 2011.