

## Multielement and rare earth element profiles in an ombrotrophic peat from Germany

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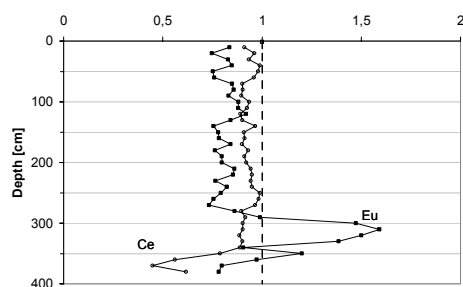
### Introduction

Ombrotrophic bogs are suggested to preserve records of enrichments of trace elements. Due to the consistent relationship between the vertical profiles and the time of deposition insights in the historical trends of atmospheric metal depositions can be obtained. Aside the pure deposition of inorganic matter the interaction of the trace elements with the natural organic matter influences their enrichment and fixation in the peat. In this presentation the results of the investigation of two cores of the ombrotrophic bog Kleiner Kranichsee, Ore Mountains, Saxony, Germany, are shown with respect to stratigraphic records of trace elements and in particular to the vertical rare earth element profiles.

### Results and discussion

The vertical profiles of metals such as K, Mg, Ca, Fe, V, Cr, Mn, Zn, Cd, Pb and U and REE were measured as well as other parameters like ash content, C, H, N, P and S. Due to the comparison of the two cores enrichment processes in various profiles, reflecting changes of the atmospheric impact, could be identified. For REE we found similar trends in all horizons of the vertical profiles, characterized by an enrichment of the HREE vs. the LREE in the chondrite normalized REE pattern. Nevertheless, the profiles of the redoxsensitive REE Ce and Eu exhibit the influence of redox barriers and the influence of the underlying material respectively (Figure 1).

Figure 1: Vertical profile of the chondrite normalized amounts of Ce and Eu.



### References

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## Impacts of iron and aluminum ions on solubility of phosphates associated with natural organic matter

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The interactions among metal ions (Fe and Al) and phosphates in natural organic matter were investigated. IHSS Elliott Soil humic acid standard, Elliott soil fulvic acid standard II, Waskish peat humic acid reference, Waskish peat fulvic acid reference, phytate and inorganic orthophosphate (all in 0.322 mM P) were separately incubated with control, AlCl<sub>3</sub> or FeCl<sub>3</sub> (3.22 mM) in 100 mM Na acetate buffer (pH 5.0) at 22°C for 20 h. These mixtures were then equally divided into two aliquots. 3-Phytase (0.1 U/ml) or water was added into these aliquots. After 20-h incubation at 37°C, soluble inorganic P in these mixtures was determined by a modified molybdenum blue method. Less than 1% of phytate P was detected in the absence of the enzyme. About 24% of P in Elliott soil humic acid and fulvic acid, or 5% of Waskish peat humic acid and fulvic acid P was molybdenum reactive P. Enzymatic hydrolysis released 75% of phytate P, 17% of additional P associated with Elliott soil humic acid and fulvic acid, and 2% of additional P associated with Waskish peat humic acid and fulvic acid. Ferric ions precipitated 80% of soluble inorganic orthophosphate. Aluminum ions precipitated only 17% of soluble inorganic orthophosphate. Inclusion of metal additives lowered the detectable P in Elliott soil humic acid to 17%. Both metal ions totally inhibited the enzymatic release of phytate P. In contrast, the inhibitory influence of metal additives on enzymatic release of humic- or fulvic-associated P was not significant. These results suggest that these two metals may have preferential interactions with other functional groups to phosphoesters in humic and fulvic acids.