

Impact of atmospheric dust on Chinese peatland geochemistry

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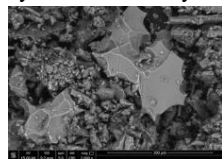
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Impact of atmospheric dust of various origin on Chinese peatland using Pb, Sr and Nd isotopes as well as REE and SEM mineralogical analysis was the subject of the study. The Motianling (Northeast China) is located at 1670 m asl, near the Chinese-Mongolian border. 64 cm peat core was dated using ²¹⁰Pb and ¹³⁷Cs [1,2]. REE were measured by ICP-MS (UAM), Nd and Sr isotopes - by TIMS (UAM), Pb isotopes were determined by Q-ICP-MS 7700x (NIGLAS).

The total Σ REE in the minerotrophic part of profile (from 64-42 cm) vary from 67 to 31 mg kg⁻¹. Mineralogical analysis revealed the occurrence of weathered volcanic rocks in this part (phot.1). The influence of surrounded quaternary volcanic rocks is supported by high ϵ Nd value (-3.26). After change from minerotrophic to more oligotrophic conditions the peatland was independent from the local bedrock weathering, what is manifested by much lower concentration of REE (7-20 mg kg⁻¹) and lower ϵ Nd (-7.37; -8.11). The anthropogenic effect is visible from 1964, when the spheroidal aluminosilicates (SAP), indicating coal fired power plant activity, appeared for the first time, followed by abrupt decrease in ²⁰⁶Pb/²⁰⁷Pb isotopic signature to 1.167. All isotopic signatures suggest the impact of western and northern sources of dust. The REE ratios are characteristic for eolian deposition signature similar to Gobi and northern Chinese deserts, while anthropogenic dust is supplied mainly by Russian industry.



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Phot.1 Tephra occurrence in the minerotrophic part of profile.

[1] Bao K. et al. (2010) J Environ Radioact 101,773–779.

[2] Bao K. et al. (2012) Sci Total Environ 431,33–45.