

## Reactivity of As-rich smelter fly ash in different soils – 6 and 12 months in situ investigation

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The reactivity of copper smelter fly ash enriched in arsenic (43.7 wt% As; mineralogy: arsenolite, galena, gypsum, litharge, anglesite) was investigated by an in situ weathering experimental approach. Double polyamide bags filled with 1 g of fly ash were incubated for 6 and 12 months in different depths of contrasting soils developed under different vegetation covers at four localities in the Czech Republic. Total concentrations of As and other contaminants were measured in soils before and after the fly ash incubations. When possible, soil pore waters were collected using rhizon samplers and analysed for concentrations of contaminants. Mass losses and changes in mineralogical compositions of the fly ash were monitored.

Transport of released As in the soils was observed within only few centimetres below the experimental bag's position. The overall mass losses from bags were between 4–28 % (6 months) and 19–32 % (12 months).

Arsenic leaching was the most significant in forest soil developed under the beech stand both after 6 and 12 months (590 mg/kg and 849 mg/kg, respectively). This is probably caused by specific seepage conditions leading to more rapid flush regime under the beech. Soils developed under the spruce stand exhibited the lowest values of As released from fly ash: 164 mg/kg (6 months) and 484 mg/kg (12 months).

Pore waters sampled after 6 months in the beech forest stand (20 cm depth) contained 9 mg/l As indicating significant leaching of fly ash. After 12 months, As concentrations were up to 13 mg/l in pore water samples collected in the soil under the beech. Under the spruce, As in the soil pore water was only up to 47 µg/l. Arsenic speciation analysis of pore water samples showed that almost all of As (98–100 %) has been oxidised to As<sup>V+</sup>.

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