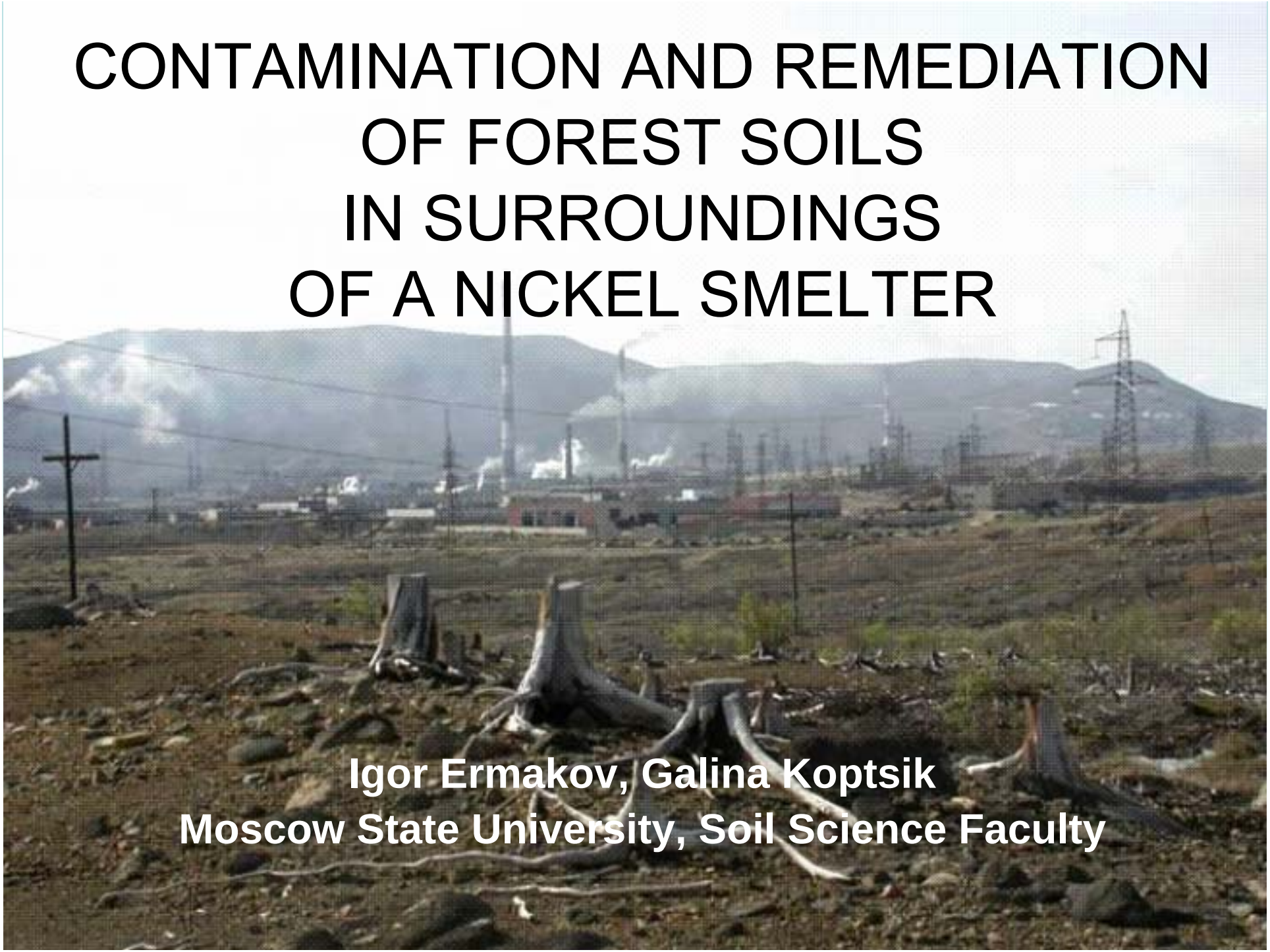
CONTAMINATION AND REMEDIATION OF FOREST SOILS IN SURROUNDINGS OF A NICKEL SMELTER



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Podzol soils under spruce forest and agricultural vegetation

Aims:

- to find out the main patterns of heavy metal pollution under simulated atmospheric precipitation
- to forecast natural remediation of podzol soil if atmospheric pollution would be stopped
- to develop a simple and economical technology for metal in-situ removal from contaminated soils

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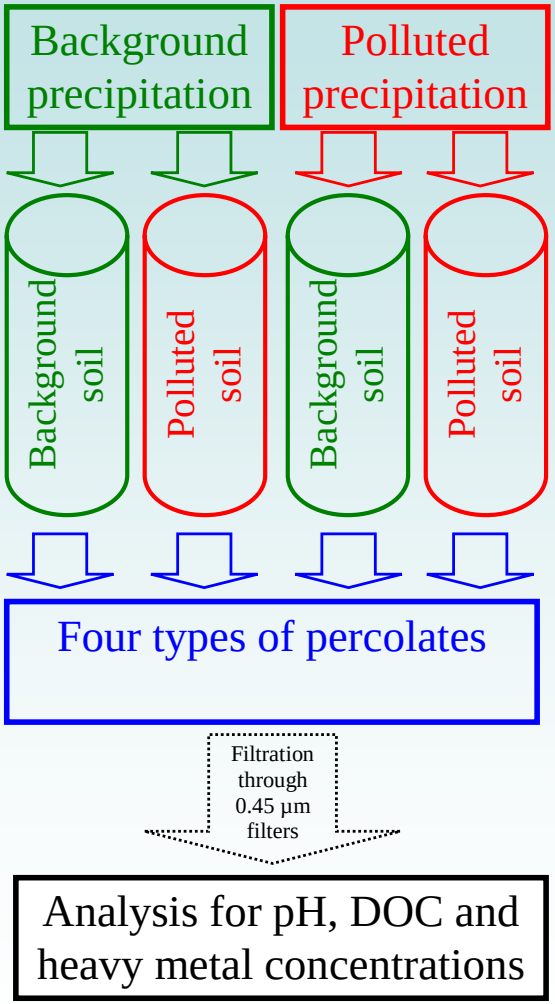
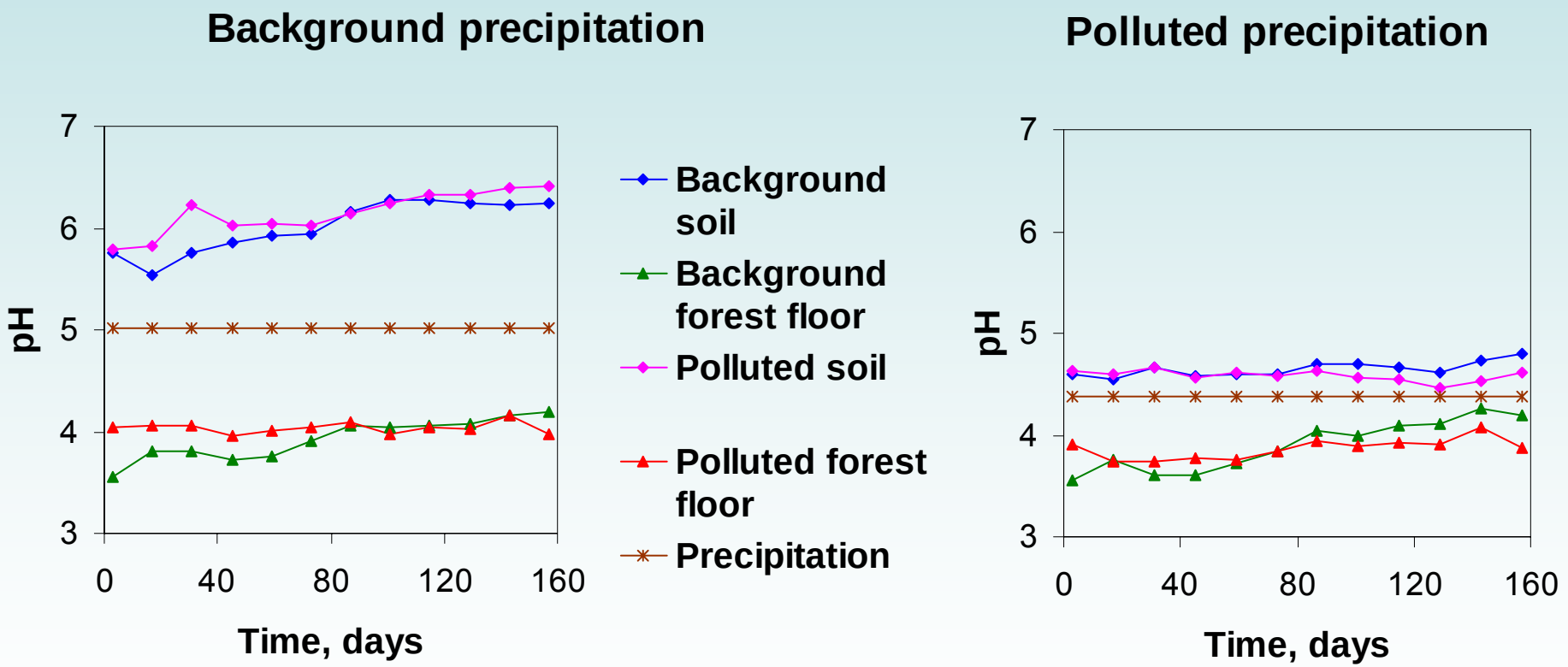
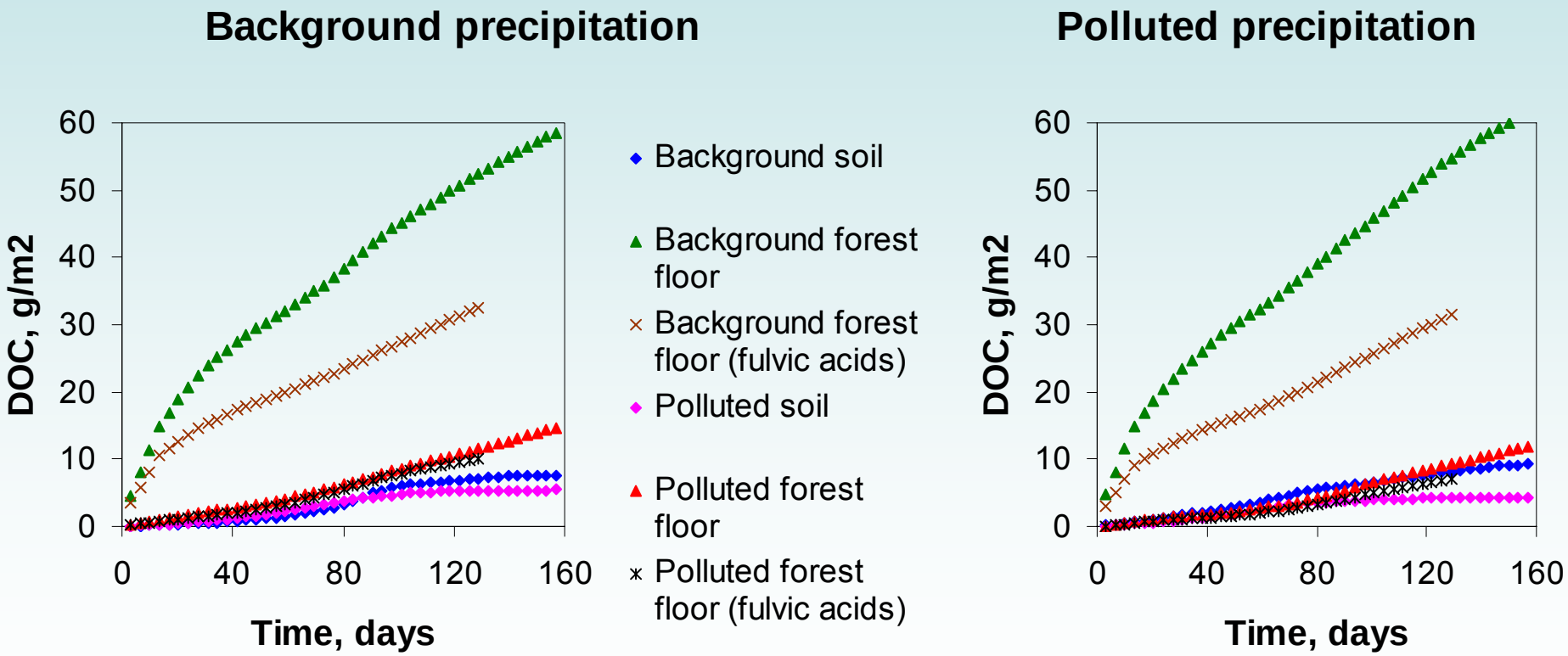
Scheme of column experiment



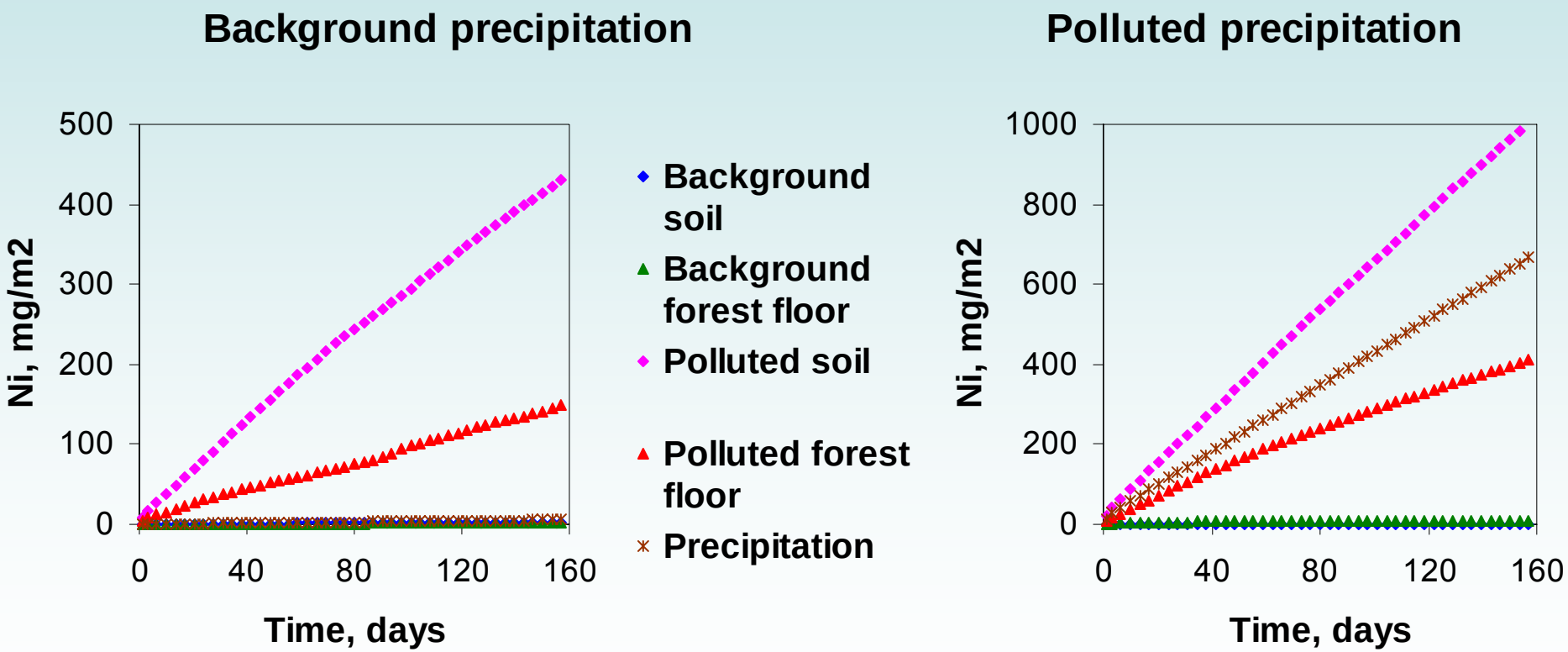
pH values in column percolates



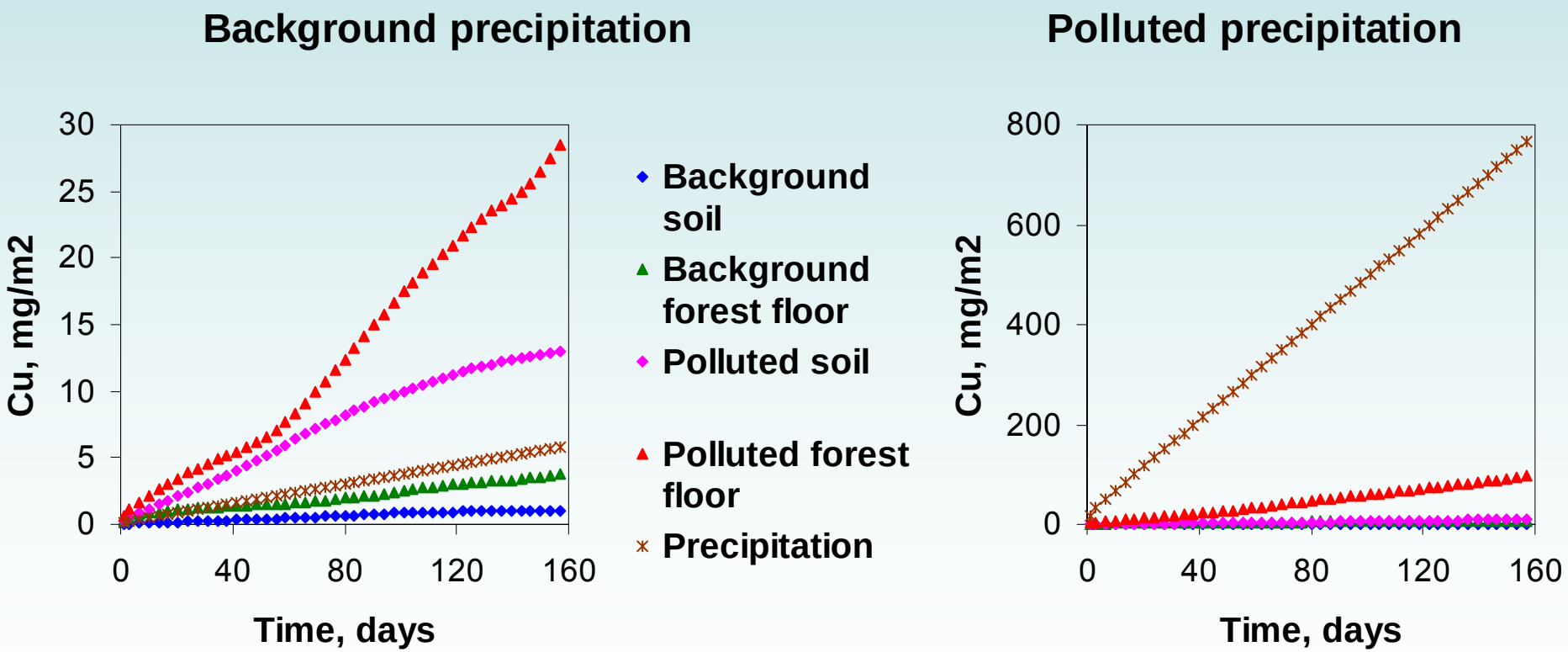
Leaching of DOC under simulated precipitation (cumulative curves)



Leaching of nickel under simulated precipitation (cumulative curves)

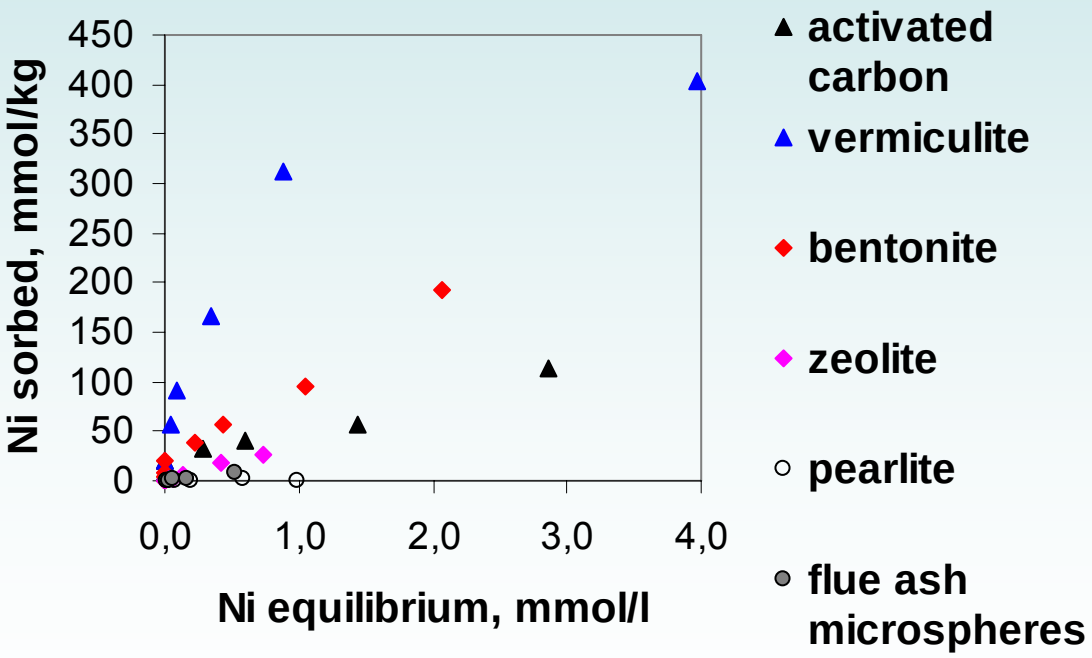


Leaching of copper under simulated precipitation (cumulative curves)

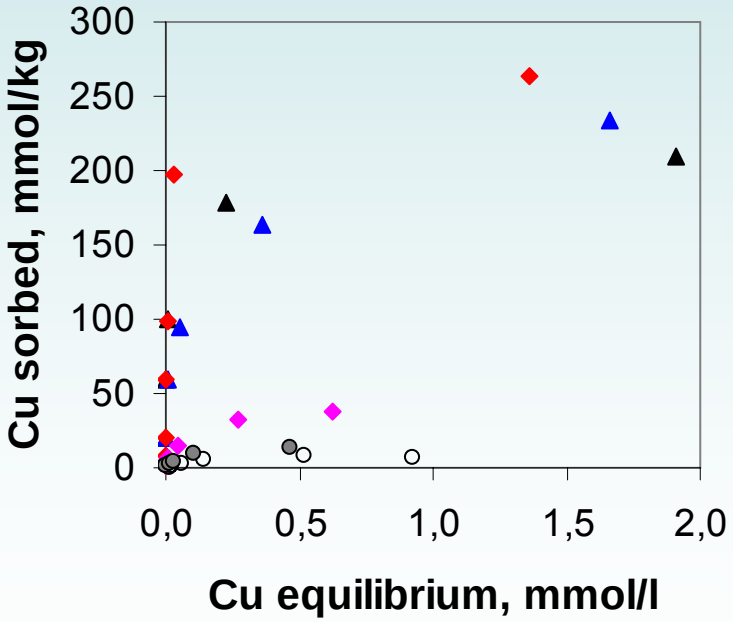


Testing of different sorbents for heavy metal retention

Ni adsorption isotherms



Cu adsorption isotherms



Conclusions:

- Contaminated precipitation strongly acidified the mineral soil layers, and there is a real possibility for acidification of ground waters.
- The background forest floor has a very high retention capacity towards both Ni and Cu. Contaminated forest floor kept almost the same buffer capacity towards Cu but strongly decreased the accumulation of Ni.
- The retention of metals in the mineral layers was much less significant. Although the polluted mineral layer removed the majority of input Cu, it had a little effect on percolate Ni concentrations.

Conclusions:

- Natural soil remediation is impossible without simultaneous contamination of ground waters.
- Leaching of Ni from the soils is more rapid than that of Cu, and the risk of Ni contamination of ground waters is higher.
- Leaching of Cu would be expected to take place over a longer time period, giving a consequently lower risk of groundwater pollution.
- Testing of different sorbents showed that activated carbon and vermiculite can be used for Cu retention. Vermiculite also has the highest retention capacity towards Ni.

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- **CLEANSOIL - An Innovative Method for the On-Site Remediation of Polluted Soil Under Existing Infrastructures** (INCO-CT-2005-013420)


Thank you for attention