Universität Basel

Research Project

Bioavailability and transformation dynamics of mercury in soil quantified by stable isotope dilution techniques

Project funded by own resources

Project title Bioavailability and transformation dynamics of mercury in soil quantified by stable isotope dilution techniques
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Organisation / Research unit
Departement Umweltwissenschaften / Umweltgeowissenschaften (Alewell)
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: Mercury is a toxic heavy metal that can cause severe health problems to humans. Mercury is released to the environment naturally through volcanoes and through human activities e.g. coal-fired power stations.
Elemental mercury (Hg0) is a long-lived form that represents 95% of the atmospheric mercury and can be
transported to long distances and deposited to aquatic and terrestrial environments making it a pollutant of
global concern. Most of the deposited mercury is stored in soils and may be accumulated by plants. Some is
reemitted to the atmosphere and a substantial part migrates to ground and surface waters. It appears from
the available literature that the mechanisms by which mercury is retained or become bioavailable in soil and
the kinetics of these reactions need further investigation. Isotopic dilution is a modern technique that utilizes
the abilities of Inductively Coupled Plasma Mass Spectrometry to assess the labile metal content of soils which is accessible to plants. This work aims to (i) develop a reliable stable isotope dilution procedure to estimate the current bioavailability of mercury in Hg-enriched Swiss soils and thus potential health risks, and
(ii) to investigate and model the dynamics of inorganic mercury added to soil (e.g. via rainfall) by following
the temporal change in solubility of inorganic mercury tracer added to soil microcosms. The hosting team led
by Prof. Alewell, University of Basel, has a considerable experience in the biogeochemistry of mercury and is
currently running a project to study the evasion of mercury from boreal mires.

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