

Tuesday 7th Mai 2024, 4.15 pm
Seminarraum 324, Mittelstrasse 43

Leveraging Isotope tools to Determine the Fate of Trace Metals in Agroecosystem

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ABSTRACT. Trace metals like zinc and iron are crucial for all living organisms. Yet, excessive application of some of these micronutrients to soils can harm soil fertility. Cadmium, another trace metal, is non-essential and highly toxic and follows pathways of essential trace metals in soils and crops. As the concentrations and bioavailability of trace metals in soils can vary significantly, trace metals create several challenges in agriculture. For instance, many soils contain small stocks of trace metals that are available to crops, which exacerbates nutrient deficiencies in crops and humans. For the latter, it is estimated that 2 billion people are at risk for micronutrient deficiencies. Likewise, it is estimated that about 6 % of European and 10 % of Chinese agricultural soils are polluted with trace metals. This pollution can threaten soil functions, drinking water, and crop quality. This delicate balance of trace metals in plant nutrition is tightly linked to societal challenges addressed in the UN's sustainable development goals of reducing hunger in all its forms, responsible production, and protect terrestrial ecosystems. In this colloquium, I will present how novel isotope tools can be used to precisely quantify fluxes of trace metals and to identify the underlying biogeochemical processes that control these pathways along the soil-crop-human continuum.

BIO. Matthias Wiggerhauser, 'Oberassistent' at ETH Zurich in the Group of Plant Nutrition. He has studied Geography at the University of Bern with a strong focus on Soil Science. During his PhD and Post-Doc positions, he acquired a dual expertise in soil and plant sciences and strongly collaborated with geochemists to adapt state-of-the-art analytical isotope and speciation approaches to address the interdisciplinary challenges related to trace metals in plant nutrition.