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Integrating models and measurements to advance the understanding of Se cycling across the atmosphere-soil interface, *session*

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Selenium (Se) is an essential dietary micronutrient for humans and livestock. Proteins containing Se (selenoproteins) in form of the amino acid selenocysteine are important for many key biological processes, including the cellular response to oxidative stress [1]. However, as a micronutrient, Se has a very narrow range of safe intake levels, with both too low and too high intakes that can lead to adverse health effects [2]. Se levels in nutrition are closely linked to the total amount, but also to the chemical speciation of Se in soils, with the latter largely controlling the bioavailability of Se to plants. As Se occurs in all environmental compartments, i.e., lithosphere, pedosphere, biosphere and atmosphere, it is important to study the cycling of Se within and across compartments to better understand its environmental distributions as well as the controlling mechanisms.

In this talk, we will focus on the atmosphere-soil interface. Atmospheric deposition is a major source of Se to soils and predicted to decrease in the future [3], potentially affecting global (micro)nutrient levels. We will address how measurements and modeling can advance our understanding of Se distributions in soils and indicate further research gaps. We will discuss geospatial modeling of Se in soils (e.g., [4]) and process-based modeling of atmospheric Se cycling (e.g., [3]), and how these approaches can be linked. Furthermore, we will show how measurements of Se concentrations and its chemical speciation in soil samples [5] and atmospheric deposition can inform modeling approaches to improve predictions of environmental Se distributions in a future climate. Finally, we will discuss potential impacts of environmental changes on future Se levels in plant-based nutrition.

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