**Session Proposal**

# Session Title

Soil Carbon Dynamics and Impacts of Land Use and Management

# Session Organizers

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# Session Description

Soils act as both sources and sinks for atmospheric CO2 and play a crucial role in regulating the global carbon cycle. They serve as reservoirs for significant amounts of organic carbon (SOC) and inorganic carbon (SIC), contributing to carbon storage and sequestration. However, SOC is subject to decomposition, and SIC to dissolution, both processes generating CO2 that can be emitted into the atmosphere. Despite extensive research, our understanding of the transformation and transfer among various carbon pools remains limited.

Interactions between SOC and SIC are critical in determining the overall carbon dynamics of soils, as both pools influence carbon fluxes in unique yet interconnected ways. The interplay between organic and inorganic carbon is particularly significant in high-pH soils, where SIC formation can be linked to SOC decomposition processes. This session provides a forum to explore the latest advances in soil carbon dynamics across diverse ecosystems and climates. It aims to investigate how land use and management practices influence soil physical and chemical properties, shaping carbon cycling processes within soil profiles. Special emphasis will be placed on discussing innovative methodologies and technologies, such as isotopic tracing and predictive modeling, to improve our understanding of soil carbon interactions. Additionally, the session seeks to address emerging challenges in soil carbon research, such as the impacts of climate change and intensive agriculture, while promoting strategies for sustainable land management.

# Format

Oral presentations

# Proposed Speakers

Dr. Yakov Kuzyakov (University of Göttingen) is a leading soil scientist specializing in soil ecology, biogeochemistry, and rhizosphere processes. He has significantly advanced the understanding of the priming effect, microbial hotspots, and soil-plant interactions. With over 900 published papers and an H-index of 121, his contributions span carbon and nitrogen cycling, isotopic labeling techniques, and sustainable agricultural practices. Dr. Kuzyakov’s innovative research has influenced global soil science and earned him recognition as a highly cited researcher. He currently leads the Departments of Soil Science of Temperate Ecosystems and Agricultural Soil Science at the University of Göttingen.