**Session Proposal**

# Session Title

Soil structure and ecosystem functioning in Earth's Critical Zone

# Session Organizers

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# Session Description

This session explores the dynamic interactions between soil structure and ecosystem processes within Earth's Critical Zone. Soil structure governs water retention, nutrient dynamics, and microbial activity, making it a key factor in ecosystem resilience and function. Understanding soil aggregate formation and stability, pore network evolution, and biogeochemical interactions is essential for predicting soil responses to environmental changes. We welcome research on soil structure dynamics in natural and managed ecosystems, focusing on physical, chemical, and biological drivers. Topics of interest include soil aggregation, carbon and nitrogen cycling, and their roles in climate change mitigation. Studies employing field experiments, modeling, and advanced analytical techniques to investigate soil structure across spatial and temporal scales are particularly encouraged.

# Relevance

This session aligns with the congress theme, *Soil and the Shared Future for Humankind*, by addressing soil structure dynamics and their role in sustaining ecosystems. It explores soil aggregation, biogeochemical cycling, and ecosystem resilience, which are critical for climate adaptation and sustainable land management. By integrating physical, chemical, and biological perspectives, this session highlights innovations that enhance soil health, ensuring a sustainable future for Earth's Critical Zone ecosystems.

# Format

Oral presentations and Poster presentations

# Proposed Speakers

**Speaker 1, Vanessa Bailey**, PNNL, Vanessa Bailey uses a suite of molecular chemical and multi-omic approaches to answer questions about the stability and vulnerability of soil carbon. Her research is conducted both in the field, where landscape processes are observed and soils sampled, as well as in the laboratory where studies occur in controlled microcosms.

**Speaker 2, Alexandra Kravchenko**, Michigan State University, Alexandra Kravchenko’s research interests include micro- to macro-scale biogeochemical processes involved in soil carbon and nitrogen cycling. She focuses on understanding the role of soil pores in micro-scale processes driving soil carbon sequestration and greenhouse gas emissions; and the role of the interactions between land use and management, soil properties and topography for spatial variability of soil carbon sequestration and greenhouse gas emissions across agricultural fields and landscapes.

**Speaker 3, Shihong Yang**, professor at Hohai University, is a well-known expert in the field of soil science. As the project leader, he has presided over more than 30 projects, won 8 provincial and ministerial science and technology awards, published 2 monographs, and won 1 Best Paper Award from the International Society of Paddy and Water Environment Engineering (PAWEES). He has published more than 80 academic papers (more than 50 SCI papers as the first/corresponding author, more than 10 EI papers), over 3,500 citations (Google Scholar), and an h-index of 32.