**Session Proposal (202)**

# Session Title

Advances in soil carbon dynamics across scales: from molecules to ecosystems (session proposed by the IUSS Commission 2.02 - Soil Chemistry)

# Session Organizers

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# Session Description

Soil organic carbon (SOC) plays a pivotal role in ecosystem function, biogeochemical cycling, and climate regulation, yet its dynamics remain complex and context-dependent. This session will explore recent advances in understanding SOC processes across disciplines and scales. We welcome contributions that integrate experimental, observational, and modeling approaches to illuminate the mechanisms driving soil organic matter formation, stabilization, and loss. Topics may include —but are not limited to— effects of context on drivers and processes of SOC persistence, faunal and microbial aspects, structural complexity and organo-mineral interactions, disturbance impacts, and novel methods for integrating findings from microsites to ecosystems. Special emphasis will be placed on studies that bridge scales, link mechanistic insights with emergent patterns, or inform management and climate mitigation strategies. By bringing together researchers from diverse disciplines, this session aims to foster a systems-level understanding of SOC dynamics and their role in a changing world.

# Relevance

SOC management is of utmost importance for maintaining soil health across land uses. It underpins vital soil ecosystem services, including agricultural and forest production, climate change mitigation and adaptation, and protection of biodiversity and is therefore a central component of many soil monitoring schemes and policies. A system-level understanding of SOC dynamics can inform better practices, policies, and restoration strategies across land uses, aimed at enhancing carbon retention and ecosystem resilience.

# Format

**‌Oral Presentations‌:** Featuring also a keynote speech by renowned expert.

**‌Poster Presentations‌**

# Proposed Speakers *(List potential speakers (if any) you intend to invite, including their affiliations and a brief description of their contributions to the session)*

To be updated later depending on availability