**Session Proposal**

# Session Title

Democratizing Digital Soil Mapping: Innovative Technologies for Global Soil Services and Solutions

# Session Organizers

Asim Biswas, University of Guelph, biswas@uoguelph.ca (primary contact person)

Gan-Ling Zhang, Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, glzhang@niglas.ac.cn

Zhou Shi, Zhejiang University, shizhou@zju.edu..cn

Songchao Chen, Zhejiang University, chensongchao@zju.edu.cn

# Session Description

This session focuses on democratizing digital soil mapping (DSM) technologies and making them accessible to diverse stakeholders worldwide. In an era where a soccer pitch of soil is eroded every five seconds and projections suggest 90% of Earth's soils could be degraded by 2050, accessible DSM solutions represent a critical tool for guiding sustainable land management decisions to secure our collective future.

The session will explore cutting-edge innovations in DSM, including cloud computing platforms, open-source algorithms, artificial intelligence, and machine learning approaches that are transforming how we collect, process, analyze, and visualize soil spatial information. Of particular focus will be recent breakthroughs in integrating multiple data streams—from satellite imagery and drone-based sensors to crowdsourced observations and legacy soil data—to produce high-resolution soil maps with quantified uncertainty.

We will highlight successful implementations of DSM in diverse contexts, from smallholder farming systems in developing regions to precision agriculture in advanced economies, demonstrating how these technologies can bridge the digital divide. The session will showcase operational soil information systems that deliver actionable insights for land users, policymakers, and other stakeholders through user-friendly interfaces and decision support tools.

Critical discussions will address challenges in DSM adoption, including data harmonization, technical capacity development, and institutional frameworks needed to sustain digital soil services. The session will emphasize emerging interoperability standards, collaborative platforms, and training approaches that can accelerate the global uptake of DSM technologies to address pressing challenges in soil conservation, climate change adaptation and mitigation, food security, and environmental sustainability.

By bringing together experts from diverse disciplines and regions, this symposium aims to catalyze new partnerships and identify pathways to scale DSM applications for maximum impact on soil health and human wellbeing—ensuring that soil continues to support life, filter water, grow food, and capture carbon for generations to come.

# Format

The session will feature a combination of:

* Keynote presentations (~25 minutes each)
* Oral presentations (~15 minutes each)
* Interactive panel discussion (~45 minutes)
* Poster presentations

# Proposed Speakers

* Dr. Ganling Zhang, Nanjing Institute of Geography and Limnology, Chinese Academy of Sciences, contribution: leading expert in digital soil mapping
* Dr. Zhou Shi, Zhejiang University, contribution: leading expert in digital soil mapping.
* Dr. Laura Poggio, International Soil Reference and Information Centre (ISRIC), contribution: Expert in global soil mapping and developer of SoilGrids, focusing on cloud-based approaches for generating high-resolution soil property maps.
* Dr. Budiman Minasny, University of Sydney, contribution: Pioneer in digital soil mapping methodologies and applications for sustainable land management, with extensive experience in developing regions.
* Dr. Gerard Heuvelink, Wageningen University, contribution: Leading authority on quantifying and communicating uncertainty in digital soil maps for improved decision-making.
* Dr. Nicolas Saby, French National Institute for Agriculture, Food, and Environment (INRAE), contribution: Expert in national soil monitoring networks and their integration with digital soil mapping frameworks.
* Dr. Lucia Anjos, Federal Rural University of Rio de Janeiro, contribution: Specialist in tropical soil mapping and applications for smallholder agriculture in developing countries.
* Dr. Gustavo Vasques, Brazilian Agricultural Research Corporation (EMBRAPA), contribution: Expert in digital soil mapping for tropical regions and developer of user-friendly soil information systems.
* Dr. Pierre Roudier, Manaaki Whenua – Landcare Research, contribution: Specialist in digital soil assessment and developer of open-source R packages for soil spatial analysis.
* Dr. Zamir Libohova, USDA-NRCS, contribution: Expert in integrating traditional soil survey with digital soil mapping techniques for operational soil mapping programs.
* Dr. Uta Stockmann, Thünen Institute, contribution: Expert in soil carbon mapping and monitoring for climate change mitigation programs.
* Dr. Jacqueline Hannam, Cranfield University, contribution: Specialist in applied digital soil mapping for land management and policy support.
* Dr. Yusuf Yigini, Food and Agriculture Organization (FAO), contribution: Leader in developing global soil information systems and capacity development initiatives for digital soil mapping.
* Dr. Bas Kempen, ISRIC-World Soil Information, contribution: Expert in operational digital soil mapping and developer of soil data infrastructure solutions.