**Session Proposal**

# Session Title

Soil Organic Carbon Monitoring and Management: Integrating Science, Technology, and Practice for Sustainable Ecosystems

# Session Organizers

1. Prof. Yanfen Wang, University of the Chinese Academy of Sciences (UCAS), China, yfwang@ucas.ac.cn
2. Dr. Yash Dang, University of Queensland, Australia, y.dang@uq.edu.au
3. Prof. Kai Xue University of the Chinese Academy of Sciences (UCAS), China, xuekai@ucas.ac.cn Primary Contact Person
4. Dr. Francesco Fava, Department of Environmental Science and Policy, Università degli Studi di Milano, Via Celoria 2, Milan, Italy francesco.fava@unimi.it
5. Prof. Songchao Chen, Zhejiang University, China, chensongchao@zju.edu.cn
6. Dr. Jianqing Du, University of the Chinese Academy of Sciences (UCAS), China, jqfdu@ucas.ac.cn
7. Dr. Anquan Xia, Development and Research Center (National Geological Archives of China), China Geological Survey, Beijing, 100037, China. xiaanquan17@mails.ucas.ac.cn
8. Dr. Tong Li, University of Queensland, Australia, tong.li1@uq.edu.au Primary Contact Person

# Session Description

The symposium will provide a scope for critical discussion on soil organic carbon (SOC) across agricultural and natural ecosystems, including its measurement, spatial distribution, driving processes, and practical management. The session will explore the biogeochemical mechanisms regulating SOC stability and sequestration, and how they can be monitored using both conventional and emerging technologies.

Practical solutions for SOC monitoring and management will be shared extensively among experts and practitioners, including laboratory-based techniques, proximal sensing methods such as mid-infrared (MIR) and visible–near-infrared (vis–NIR) spectroscopy, and remote sensing with AI tools. An integrated approach that combines these technologies with sustainable land-use practices will be outlined, focusing on methods that are both economically viable and scalable.

This symposium will also provide a platform to discuss SOC’s role in climate change mitigation, soil health improvement, and carbon accounting frameworks at national and regional scales. Case studies from international collaborations, such as the Australia–China Carbon Partnership, will illustrate how science and technology can support sustainable soil carbon strategies in diverse socio-economic contexts.

Key topics include:

* Comparative methods for SOC monitoring: laboratory, proximal, and remote sensing approaches.
* Advances in calibration, data integration, and uncertainty assessment.
* SOC mapping across scales: from point data to national inventories.
* Management practices and policies to enhance SOC stocks in diverse ecosystems.
* Challenges and opportunities in implementing SOC solutions in different socio-economic contexts.

The symposium will offer valuable networking opportunities for domestic and early-career soil scientists, as well as established international experts working on SOC and climate-smart land management.

# Relevance

This session supports the congress theme of “Soil and the Shared Future for Mankind” by addressing the critical challenge of monitoring and managing SOC across ecosystems. It highlights innovative, cost-effective technologies—such as proximal and remote sensing—for accurate SOC estimation. By linking scientific advances with practical applications, the session contributes to global efforts in climate change mitigation, sustainable agriculture, and land restoration.

# Format

* Oral presentations by leading researchers and practitioners
* Panel view sight with academic and industry experts
* Interactive workshops/masterclass for early-career researchers and stakeholders
* Roundtable discussion

# Proposed Speakers

* *Dr. Tong LI, University of Queensland, Australia – A early career expert in soil organic carbon sequestration and measurement techniques.*
* *Dr. Anquan Xia, Development and Research Center (National Geological Archives of China), China Geological Survey, Beijing, China*
* *Prof. Xiaoyong Cui, University of the Chinese Academy of Sciences, China – Specializing in remote sensing applications for soil carbon management.*
* *Dr. Sean Manning, Ziltek, Australia – A pioneer in the development and application of MIR technology for SOC estimation. sean.manning@ziltek.com*
* *Dr. Gafur Gozukara, Eskisehir Osmangazi University, Department of Soil Science and Plant Nutrition, Eskisehir 26160, Turkey ggozukara@ogu.edu.tr*
* *Dr. Yakun Zhang Department of Crop and Soil Science, Oregon State University, 2750 SW Campus Way, Corvallis, OR, 97331, USA zhang878@wisc.edu A early career expert in soil organic carbon sequestration and measurement techniques.*
* *Prof. Alfred E. HARTEMINK, University of Wisconsin-Madison, Department of Soil Science, FD Hole Soils Lab, 1525 Observatory Drive, Madison WI 53706 (USA) hartemink@wisc.edu. A distinguished career expert in soil organic carbon sequestration and measurement techniques.*
* *Matthias Kuhnert, Institute of Biological and Environmental Sciences, University of Aberdeen, Aberdeen, UK. matthias.kuhnert@abdn.ac.uk A distinguished career expert in soil organic carbon sequestration and measurement techniques.*