**Session Proposal**

# Session Title

Soil nitrogen processes, consequences, and regulations.

# Session Organizers

Feng Zhou, College of Urban and Environmental Sciences, Peking University, zhouf@pku.edu.cn, primary contact person

Baojing Gu College of Environmental & Resource Sciences, Zhejiang University, bjgu@zju.edu.cn

Jun Shan, Institute of Soil Science, Chinese Academy of Sciences, shanjun@issas.ac.cn

# Session Description

Nitrogen plays a crucial role in soil ecosystems, influencing plant productivity, soil health, and environmental sustainability. However, the intricate processes governing nitrogen cycling in soils are often poorly understood, and imbalances in nitrogen use can lead to significant environmental challenges, including water contamination, greenhouse gas emissions, and biodiversity loss. This session will provide a platform for researchers, practitioners, and policymakers to exchange the latest findings on soil nitrogen processes, their effects on agroecosystems and natural environments, and effective regulation strategies. The scope of the session encompasses fundamental studies of nitrogen transformation processes in soils, including mineralization, nitrification, denitrification, and nitrogen fixation, as well as emerging research on microbial contributions and biogeochemical interactions. It will also address the environmental and agronomic impacts of nitrogen mismanagement, exploring the linkages between soil nitrogen dynamics, greenhouse gas emissions, water quality, and ecosystem health. Relevance to policy and practice is a key focus of this session. Presentations will highlight innovative approaches to improve nitrogen use efficiency, reduce nitrogen losses, and mitigate the environmental footprint of agricultural systems. The session will also examine regulatory frameworks, economic incentives, and technological innovations designed to achieve sustainable nitrogen management across diverse landscapes. This session invites contributions from soil scientists, ecologists, agronomists, and environmental policymakers, aiming to foster interdisciplinary dialogue and identify actionable pathways to enhance soil nitrogen management at global, regional, and local scales. Through collaborative discussions, this session seeks to advance our understanding of soil nitrogen processes while supporting the development of practical solutions to address one of the most pressing challenges in soil science and environmental sustainability.

# Format

Oral presentations

# Proposed Speakers

Feng Zhou, College of Urban and Environmental Sciences, Peking University, zhouf@pku.edu.cn (Feng Zhou is Boya Distinguished professor of Physical Geography in College of Urban and Environmental Sciences at Peking University. He aims to improve our understanding of the interaction between climate change and agriculture using flux observations, manipulative experiments, and land surface models. He has been funded with 9 NSFC grants and 4 National Major Research and Development Program grants. He has published >130 peer-reviewed articles in Nature, PNAS, Nature Geoscience etc. He has been honored with National Distinguished Young Scholar, Young Cheung Kong Scholar, Outstanding Young Scientist, and the 1st Prize of S&T Achievement from the Ministry of Education.)

Baojing Gu College of Environmental & Resource Sciences, Zhejiang University, bjgu@zju.edu.cn (Baojing Gu is a professor of sustainability at Zhejiang University, China. He has published over 130 papers in peer-reviewed journals, with notable contributions in Science (1), Nature (3), PNAS (2), Nature Sustainability (3), Nature Food (12), Nature Communications (3), Nature Climate Change (1) and The Innovation (2). In 2023, he was recognized as the international champion of the Frontiers Planet Prize. Currently, he serves as the Executive Editor-in-Chief of Earth Critical Zone, Editor of The Innovation, and Associate Editor of Earth’s Future. He is also the deputy director of the East Asia Center of the International Nitrogen Initiative (INI))

Ahmed S. Elrys, Soil Science Department, Faculty of Agriculture, Zagazig University, Zagazig 44511, Egypt, aselrys@hainanu.edu.cn (Dr. Ahmed S. Elrys is currently a full associate Professor of Soil Science Department, Faculty of Agriculture, Zagazig University. He is broadly interested in soil N cycling and the associated environmental impacts. He has authored more than 90 peer-reviewed SCI articles such as Nature Food, GCB and EST with an H-index of 26. He has received the National Natural Science Foundation of China Outstanding Youth Science Fund Project (Overseas).)

Jinbo Zhang, School of Breeding and Multiplication, Hainan University, zhangjinbo@hainanu.edu.cn (Dr. Jinbo Zhang is currently a full Professor of School of Breeding and Multiplication, Hainan University. He is broadly interested in soil N cycling and the associated environmental impacts. He has authored more than 200 peer-reviewed SCI articles such as GCB, EST, and, SBB with an H-index of 50. He has received the top Youth Talent of the National Ten Thousand Talents Program and the National Natural Science Foundation of China Outstanding Youth Science Fund Project.)

Xu Zhao, Institute of Soil Science, Chinese Academy of Sciences, zhaoxu@issas.ac.cn (Dr. Xu Zhao is currently a full Professor at Institute of Soil Science, Chinese Academy of Sciences (ISSCAS) and University of Chinese Academy of Sciences, Nanjing (UCASNJ). He is currently serving as the Director of Changshu National Agro-Ecosystem Observation and Research Station, CAS. His research interest focuses on improved CNP cycling in cropland for sustainable production. He has authored more than peer-reviewed research articles such as Nature, Science Bulletin, EP, ERL. He has rewarded with Top Ten Scientific and Technological advances in Jiangsu Province, First Prize of Science and Technology Award of Soil Science Society of China, and so forth.)

Jun Shan, Institute of Soil Science, Chinese Academy of Sciences, shanjun@issas.ac.cn (Dr. Jun Shan is currently a full Professor of Institute of Soil Sciences, Chinese Academy of Sciences. He is broadly interested in soil N cycling and the associated environmental impacts. He has authored more than 80 peer-reviewed SCI articles such as GCB, EST, and, SBB with an H-index of 31. He has received the top Youth Talent of the National Ten Thousand Talents Program and the first Prize Science and Technology Progress Award of the Soil Science Society of China, and serves as Associate Editor of European Journal of Soil Science and Soil Use & Management.)

Cameron M. Pittelkow, Department of Plant Sciences, University of California, Davis

Mark Sutton, UK Centre for Ecology & Hydrology

Luis Lassaletta, Universidad Politécnica de Madrid

Deli Chen, Melbourne University

David Kanter, New York University