



**The 5th International Symposium on Surface Earth System Science
(Circular one, November 25, 2024)**

April 10-13, 2025, Tianjin, China

Human activities are profoundly altering the Earth's surface system at an unprecedented scale and speed, fundamentally transforming its morphology, composition, and habitat. The resulting consequences, including resource depletion, ecosystem degradation, increased extreme weather events, and natural disasters, are exerting severe impact on the current and future sustainable development of humanity. To address these global challenges, we need to establish, develop, and improve Earth system science, conducting holistic and cross-disciplinary research on the surface geological system, ecosystem, and human society. Through a deep understanding of the intrinsic dynamics and mechanisms governing human-natural system interactions, we can explore the Earth's surface system's capacity for adaptation, vulnerability, and resilience. This knowledge will provide the essential theoretical framework and empirical data to balance human well-being with environmental sustainability and promote a harmonious coexistence between humanity and nature.

The School of Earth System Science at Tianjin University is approved to launch the first interdisciplinary doctoral degree program in Earth System Science in China. By combining cutting-edge research with sustainable development goals at both national and local levels, the school investigates the processes and interactions within the Earth's surface system in the context of global change. The goal is to develop Earth system science theory, construct an Earth system management framework, cultivate high-level talent for future Earth system research and management, and promote the coexistence of humans and nature and ecological and social sustainable development.

To advance the Earth system science, Tianjin university is proud to announce that The School of Earth System Science will host the 5th International Symposium on Surface Earth System Science in Tianjin from April 10th to 13th, 2025. The conference will be held in a hybrid format, combining both online and offline participation, and will bring together distinguished scholars from around the world.

Host:

School of Earth System Science, Tianjin University

Co-organizers:

College of Management and Economics, Tianjin University

School of Geographical Sciences, Beijing Normal University

School of Geography and Ocean Sciences, Nanjing University

Langfang Integrated Natural Resources Survey Center, China Geological Survey

Institute of Climate and Carbon Neutrality, The University of Hong Kong





I. Themes and Sessions

1. Earth System Processes

Conveners: Yongguan Zhu, Jérôme Gaillardet, Gangjian Wei, Shuxiao Wang,
Jiubin Chen

Contact: Wang Zheng (zhengw3@tju.edu.cn)

The complex physical, chemical, biological, and human-induced processes within and between the Earth's spheres make the surface Earth system a nonlinear in terms of function evolution, and the flow and feedback of matter and energy between subsystems. Under the dual impact of global change and human activities, the key material cycling processes between and within the Earth's spheres undergo drastic changes, profoundly affecting their ecological service functions and posing numerous challenges to the sustainability of social-ecological systems. A clear understanding of the surface Earth system thus requires interdisciplinary collaboration and integrated research methodology to delineate the system dynamics and processes, and to reveal the interactions and feedback mechanisms between the Earth system's components.

Session 1.1: Evolution of Earth's Spheres

The evolution of the structure and composition of Earth's spheres under the influence of tectonic, climatic, and human activities.

Session 1.2: Anthropocene Water and Biogeochemical Cycles

The driving characteristics of human activities in global changes during the Anthropocene, and the role and changing patterns of water and biogeochemical cycles in the evolution of various spheres of the Earth system.

Session 1.3: Interactions Among Spheres and Their Environmental Effects

Complex dynamic interactions and feedback mechanisms among the lithosphere, soil, water, atmosphere, and biosphere at multiple temporal and spatial scales, and their constraints on the evolution of Earth system functions.





2. Earth System Observation and Modeling

Conveners: Gui-rui Yu, Harry Vereecken, Xin Li, Huizheng Che, Pingqing Fu
Contact: Jialei Zhu (zhujialei@tju.edu.cn)

Observation and modeling of the Earth system are the primary component of Earth system science as they provide fundamental data on the state and processes of subsystems. The integration of multi-source big data acquisition and artificial intelligence technologies has opened up new paths for analyzing the complexity of the Earth system. Whereas the development of models offers innovative approaches to understanding the Earth system, comprehensive assessments of global change provide key insights into the evolution of the Earth system.

Session 2.1: Global Change Assessment and Prediction

This session will focus on the application of cutting-edge Earth system modeling and observation methods to evaluate the evolution characteristics of various spheres under the context of global change, analyze the mechanisms of evolution, and predict the responses of key Earth system states and processes to different future global change scenarios.

Session 2.2: Earth System Modeling Theory and Model Development

This session will focus on the original development of Earth system model subsystem simulation methods, construction of new parameterization schemes for key Earth system processes, the application of observation and experimental data in Earth system model development, and the innovation of frontier simulation methods and simulation research frameworks.

Session 2.3: System Observation Data and Artificial Intelligence

This session will focus on the development of methods for acquiring systematic observation data from the sky, air, and land, the application of big data analysis methods to interpret Earth system processes, the development of Earth system data assimilation technology based on multi-source data, and the integration of artificial intelligence methods to promote new developments in Earth system data analysis and modeling.





3. Earth System Governance and Management

Conveners: Bojie Fu, Timothy Quine, Chuanglin Fang, Junguo Liu, Xiaoling Zhang, Lei Li, Siliang Li

Contact: Peng Xu (xup@tju.edu.cn)

Earth system governance refers to the management of the Earth's spheres through a systems approach, using international conventions, treaties, agreements, agendas, declarations, laws, plans, policies, and regulations, following formal and informal rules from local to global levels, to coordinate the interactions between the Earth's spheres, layers, countries, cities, and regions, and to achieve a benign cycle and efficient operating order, ensuring the Earth's sustainable development, and building a livable and beautiful Earth.

Session 3.1: Social-Ecological System Dynamics

This session will explore the coupling mechanisms, driving mechanisms, system resilience, and control paths of social-ecological systems, surrounding issues such as global urbanization and industrialization, agricultural production and food security, resource environment security, and ecological protection. It will develop social-ecological system coupling models and establish system optimization management and control paths.

Session 3.2: Resource and Environmental Management for Sustainable Development

This session will focus on the intersection and fusion of social-ecological systems and human-environment systems, exploring the planetary boundary thresholds for resource and environmental management under sustainable development scenarios. It will propose management strategies to guide social-ecological systems away from potential thresholds and into stable development states, and explore multi-level networked management modes for global social-ecological systems.

Session 3.3: Principles to Synergize Scientific Findings and Decision-Making

Based on the uncertainty of scientific knowledge and modeling, decision-making uncertainty, and political uncertainty, this session will study the challenges posed by human activity variability to Earth system governance. It will propose cooperative governance paths for sharing scientific research outcomes and co-decision-making, and propose the construction of a scientific cognitive community, a borderless Earth, and a unified common value system for Earth system governance.





II. Conference Schedule

The conference schedule will be continuously updated on the conference website:
<https://lims.tju.edu.cn/sess/>

IV. Important Dates

Abstract submission deadline: January 24, 2025 (Friday)

Online registration deadline: March 28, 2025 (Friday)

Please complete abstract submission and registration on the conference website.

V. Fees

Early Rate (<i>before Feb. 28, 2025</i>)	CNY 2000 (USD300)/person; CNY 1500 (USD200)/student
Standard Rate (<i>by Apr. 8, 2025</i>)	CNY 2500 (USD350)/person; CNY 2000 (USD300)/student
On-site Rate	CNY 3000 (USD400)/person; CNY 2500 (USD350)/student

Room rates are not covered by the registration fee.

Lunches during the conference will be provided.

VI. Contact Us

Email: sess_workshop@tju.edu.cn

