Second International Conference on All Material Fluxes in River Eco-Systems

Special Session：Novel Studies on All Material Fluxes in the Yangtze and other Rivers

Conveners: Sitong Liu (Peking Univ.), Wen Liu (Peking Univ.)

Date: October 12-13, 2019

Rivers are important paths for transport of materials and energy, and the maintenance of healthy rivers depends on the guarantee of normal material fluxes. The functions of rivers are closely related to various biotic and abiotic materials (e.g. water, sediment, natural organic matter, nutrients, inorganic substances, nano-materials, various pollutants). All Material Fluxes (AMF) provides insights into the interaction among various materials and environmental and ecological consequences. This session focuses on outstanding cases of AMF study in the large rivers like the Yangtze River. The recent research progress will be present, and the main topics include: (1) Monitoring on water, sediment, biotic and abiotic materials; (2) Bacterial, fungus, archaea and algae communities and their functions in the eco-systems; (3) Flux effects of water-sediment/water-gas interface; (4) Impact of water conservancy projects and branch inflows on water, sediment and material fluxes; (5) Water pollution prevention and control, ecological restoration and integrated river basin management.

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Special Session: Biogeochemical redox and interfacial processes of important elements and pollutants in aquatic ecosystems

Conveners: Juan Liu (Peking Univ.), Yandi Hu (Univ. of Houston), Zimeng Wang (Fudan Univ.)

Date: October 12-13, 2019

River ecosystems play an important role in the nutrient and energy recycling, link biogeochemical cycles between continents, atmosphere, and oceans, and also provide services essential to human well-being. Various biogeochemical processes occur in rivers, which are controlled by biological, chemical, geomorphic and hydrologic interactions. These interactions produce variable redox environments wherein microorganisms derive energy for metabolism and growth via redox reactions associated with major elements, including C, N, P, S, and some pollutants, such as heavy metals and organic contaminants. Biogeochemical redox processes in river ecosystems control the chemical speciation, bioavailability, toxicity, and mobility of many major elements, the release or sequestration of inorganic contaminants, the redox transformation and degradation of organic contaminants, the formation and dissolution of mineral phases, and energy flow through the ecosystem. Molecular-level understanding of biogeochemical redox processes among different components, including microorganisms, minerals, natural organic matters, and contaminants, is essential to predict the mobility, transformation, and bioavailability of major elements and contaminants, which can help us to protect the health of river ecosystem and develop new remediation strategies. This special session focuses on (but not limited to riverine system): (1) contaminant transformation and fate in redox-dynamic aquatic ecosystems; (2) electron transfer mechanisms between minerals and microorganisms or contaminants; (3) microbially mediated cycles of carbon, nitrogen, sulfur, phosphor, and iron; (4) molecular mechanisms of interfacial processes, including adsorption/desorption, dissolution/precipitation, and deposition/resuspension, on mineral surface; (5) mathematical models or novel techniques for studying biogeochemical redox processes in aquatic ecosystems.

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Special Session: Emerging contaminants and natural organic matter in aquatic ecosystems

Conveners: Guangguo Ying (South China Normal Univ.), Dongqiang Zhu (Peking Univ.), Mingquan Yan (Peking Univ.), Weiling Sun (Peking Univ.), Nan Xu (Peking Univ. Shenzhen Graduate School)

Date: October 12th-13th, 2019

Emerging contaminants (ECs) have aroused increasing concerns among the scientific community in the past decades. Typical ECs include endocrine disrupting chemicals (EDCs), pharmaceutical and personal care products (PPCPs), brominated flame retardants, and perfluorinated compounds (PFCs). ECs may show unique behaviors and risks in the aquatic environment. They can cause various toxicities to the aquatic organisms, interfere with their endocrine and reproduction systems, and induce antibiotic resistance genes. The concentration, speciation, mobility and bioavailability of ECs in the aquatic environment are also controlled by their potential interactions with other hydrologic, geomorphic, chemical and biological fluxes. Natural organic matter (NOM) strongly affects the environmental fate, bioavailability and toxicity of most organic and inorganic pollutants in natural aquatic systems. Given the intrinsic polydispersity, multi-functionality and site-specificity NOM, the task of characterizing NOM chemistry, quantifying its roles in aquatic, soil and sedimental environments is a great challenge. This special session will focus on (but not limited to): (1) Carbon cycles in representative fluvial systems, global scale carbon cycling and storage processes; (2) Innovations in the characterization and monitoring of NOM properties, and the latest techniques and strategies for the monitoring and analysis of ECs in the aquatic environment; (3) Effects of ecological processes and human activities on ECs and NOM properties; (4) the source, fate and transport of ECs at the interfaces between the water, air and sediment phases and Interactions between NOM and organic/inorganic micropollutants; (5) the toxicity, ecological risk assessment, and human health risk assessment of ECs; (6) Quantitation and control of ECs and NOM effects in natural and engineered systems.

Second International Conference on All Material Fluxes in River Eco-Systems

Special Session: Fate and transport of emerging particles, non-biological colloids, biocolloids in terrestrial and aquatic systems

Conveners: Meiping Tong (Peking Univ.), Jianying Shang (China Agricultural Univ.), Chao Jin (Sun Yat-sen Univ.)

Date: October 12-13, 2019

Fate and transport of colloids (natural colloids such as microorganisms and minerals, emerging colloids such as engineered particles and plastics, and so on) in environmental systems are of great concern because of their potential positive/adverse effects on ecosystem functions, wildlife and human health. Their interaction with dissolved contaminants such as heavy metal and organic pollutants may also alter the transport and distribution of contaminants in natural environment. Engineered particles (i.e. nanoparticles and biochar) and microbes have been shown to have great potential application in site remediation and aquifer restoration. This special session fosters the exchange among scientists from different background in order to provide a general picture of the occurrence and fate of natural and engineered colloids in aquatic and terrestrial systems. This special session focuses on (but not limited to) the following fields: (1) occurrence, fate and transport of biocolloids, nanoparticles and other particles (microplastics, biochar, and so on) in aquatic and terrestrial systems; (2) techniques/methods to detect, characterize, and quantify particles in aquatic and terrestrial systems; (3) experimental methods/models to investigate the fate and transport of colloids in natural environment; (4) interactions between colloids, particles and solid surfaces; (5) effects of colloids specially emerging particles on ecosystem.

Second International Conference on All Material Fluxes in River Eco-Systems

Special Session: Environmental Application and Implication of Nanomaterials in Water Systems

Conveners: Chuncheng Chen (Institute of Chemistry, Chinese Academy of Sciences), Wen Liu (Peking University), Chong-Chen Wang (Beijing University of Civil Engineering and Architecture), Jiguang Deng (Beijing University of Technology)

Date: October 12-13, 2019

With the rapid development of nanoscience and nanotechnology, applications of nanomaterials in environment monitoring and remediation area are greatly focused. Various novel nanomaterials have been developed for removal of contaminants from waters or wastewaters. In addition, the environmental behaviors (e.g., aggregation, deposition, fate, transport, *etc.*) and toxicity of the engineered nanomaterials are also of great concern, once they are released to natural water systems. Therefore, full understanding the interactions between nanomaterials and contaminants in water matrix, as well as that between nanomaterials and typical materials in natural water systems including sediment, inorganic ions, natural organic matters (NOMs) and microorganisms, is key scientific issue in this area. This special session fosters the exchange and discussion among scientists from different background to provide a general picture of environmental application and implication of nanomaterials in aquatic systems. This session focuses on (but not limited to) the following fields: (1) Design and synthesis of novel functional nanomaterials for water detection and decontamination; (2) New technologies and methods on water pollution control with the aid of nanomaterials; (3) Mechanistic insight into mechanisms on nanomaterial-contaminant interaction ; (4) Transport and transformation of nanomaterials in aquatic system and the environmental geochemical processes; (5) Environmental toxicology and health effects of nanomaterials; and (6) Progress in theoretical and computational chemistry related to nanomaterials for environmental applications.