

Toward synthesis of watershed sciences

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I organize this session for synthesis of watershed sciences, through which we aim to understand dynamical processes of interactions between organisms, nutrients and other materials in watersheds from mountain tops to receiving water. The session will be integrating a variety of research disciplines including limnology, pedology, ground water hydrology, sedimentology, coastal oceanography, meteorology, forestry, agriculture, fishery and more. The watershed sciences also challenge us to solve environmental issues emerged in the watersheds through our profound understanding of relations between humanity and nature in social-ecological systems. For instance, on one hand, human land uses alter dynamics of sediments, macro- and micro-nutrients and pollutants in soils and waters on catchment scales, while changing climates may alter the frequency and intensity of natural disaster, sometimes having catastrophic effects on the watershed systems. On the other hand, globalization causes transboundary pollution and biological invasion between watersheds. Such anthropogenic disturbances, in turn, reduce quality and quantity of natural resources in watersheds and coasts and thus deteriorate ecosystem services, posing a risk to sustainable human development. The dogma of watershed sciences may lead us to the solution for sustainable future of watershed systems as the basis of our existence. This session also calls for ideas on new methods for the watershed sciences, such as tracer and molecular technique, modeling and paleontological approaches, laboratory and field experiments, and so on, in order to elucidate biological, chemical and physical mechanisms for shedding light on natural phenomena and their changes over time in complex and dynamic watershed systems. Through this session, we would like to facilitate interdisciplinary collaboration among participants to create new knowledge on watershed sciences.

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