

Hydrological connectivity of river ecosystems

Description

Hydrological connectivity of river ecosystems describes the exchange of solid matter, water, and organisms along rivers. Connectivity refers to three dimensions with respect to the bulk flow direction: (1) longitudinal connectivity, (2) lateral connectivity with riparian zones, and (3) vertical connectivity with the hyporheic zone. Hydraulic structures such as dams, levees, or bank reinforcement may hinder connectivity in its three dimensions.

Hydrological connectivity has increasingly become an important research topic due to its critical role in embracing the multidimensional fluxes of energy and matter across multiple scales and processes. Hydrological connectivity is essential not only to ecological integrity but also to the development of human civilization. However, intensive anthropogenic disturbances and climate change affect hydrological connectivity at a historically unprecedented rate and contributes to a dramatic loss in global aquatic biodiversity and productivity. Therefore, cumulative alterations of hydrological connectivity are deteriorating ecosystems, resulting in emergent ecological patterns of global concern.

In the following decades, an expected increase in human population combined with economic expansion, dramatic land-use changes due to urbanization of developing countries, more complex flooding patterns triggered by climate change, are projected to reshape the Earth's hydrological functioning and structure. In this context, there is an urgent need for cross-disciplinary research on the effect of spatio-temporal anthropogenic and natural disturbances of hydrological connectivity on a local, regional, national or global scale.

This session invites scientific contributions focusing on temporal and spatial changes associated with hydrological connectivity in fluvial and riparian systems with an emphasis on human-driven and climate change-caused changes in hydrological connectivity. An equally important objective of this special issue is to shed light on the role of hydrological connectivity as a driver of riverine and riparian ecosystem dynamics.

Conveners

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- **Yujun Yi**, Beijing Normal University, Beijing, China
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