

Ecosystem disturbances and regime shifts due to extreme rainfall events

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Stability and predictability of ecosystems are essential for the security and sustainability of our life. In recent years, many freshwater ecosystems experienced abrupt disturbances due to extreme climate events, and some of them are yet to recover. Climate warming increases and intensifies such extreme events along with a long-lasting unidirectional forcing to ecosystems. While societal demands are increasing, there is a need for practical guidelines to assess potential damages and resilience of ecosystems in response to extreme climate events, our current understanding is limited due to a lack of observations and theories. This project, led by the Japanese Society of Limnology under the collaborations with other societies such as Japan Society of Civil Engineers and so on, aims to evaluate the impacts of extreme climate events and the unidirectional long-term climate change on freshwater ecosystems through intensive monitoring aided by social networking services. In particular, it focuses on the impact of extreme rainfall events on an array of systems with different residence times that are expected to receive different degrees of disturbance (devastating - small). The project also aims to detect qualitative changes and regime shifts in the systems associated with the unidirectional climate change through long-term monitoring. The project center is located at the University of Shiga Prefecture where observational data are sent on a real-time basis. Monitoring sites are placed on selected rivers, lakes, and marshes in all prefectures, including Lake Biwa, Oze Marshland, Otakigawa drainage system, and Monobe River, where potential regime shifts and abrupt changes are observed by society members and other local people. The increase in extreme rainfall events is a global environmental issue, and qualitative and quantitative ecosystem changes are disastrous to people all over the world. For example, floods transport local species to another area and destroy local vegetation and landscape, resulting in degradation of ecosystem services provided by *in situ* food web including microorganism, insects, and fish. If we do not have reliable data, governments cannot restore their original ecosystems after the abrupt change caused by floods. We are primarily concerned about keeping the systematic description on our environments before and after extreme events. Due to the scale and urgency, the problem should be tackled by the Japanese Society of Limnology as a responsible organization. Through this five-year project, the society organizes a collaborative network of researchers and residents, and aims to develop a system in order to release up-to-date information on the ecosystems that receive devastating disturbances.

<http://www.jslim.jp/>

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