

## Earth surface processes and environmental changes in lake-catchment systems

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It is comparatively easy to obtain detailed data and literature regarding climate and meteorological phenomena related to every aspect of environment for the modern instrumental observation period. As a result, it is possible to discuss the many aspects of global environmental changes in the period. Further, it has gradually become possible to predict future changes. However, significant limitations still remain. One such problem is the limitation of sequential documentation and data, both chronological and spatial. Currently most detailed discussions on future predictions are based on quantitative data of the instrumental observation period.

In the view point of prediction and estimation of environmental change, and environmental management strategies, detailed knowledge is required of the response of the earth's surface system (including the human domain) to external environmental changes; understanding temporal changes in the environment and environmental processes is indispensable. This becomes essential to understanding the environmental processes. 'Lake-catchment' system is a possible system combining environmental processes with temporal environmental changes (recorded in lake sediments).

Changes in the physical environment of the earth's surface, for example, due to external forces such as heavy rain falls or earthquakes, bring about such responses as topographic changes; soil erosion, land slides, etc. which relate to the mass movement and sediment discharge. It is well-known that environmental changes are recorded in lake or reservoir sediments when there are some lakes or reservoirs in the down stream. In a semi-closed system, such as a 'Lake-catchment system', the relationship between the changes in the physical environment within the catchment and lake sediment records is often very clear. Especially, when the system is instrumentally observed, the above relationship becomes causally clearer. Then, sediment records become an effective clue to clarify phenomena within the catchment (environmental processes). This is the first important step to combine observational information with paleo-records beyond observational limit.