

# **Estimation of the impacts of cascade hydropower exploitation on ecological environment in river basin based on remote sensing**

Qiuwen Zhang, Ryosuke Shibasaki, Cheng Wang

HuaZhong University of Science and Technology, China; University of Tokyo, Japan

qwzhang\_hust@163.com

The exploitation of cascade hydropower in a river basin is an international tendency. This paper summarizes the main modes of cascade hydropower exploitation in a river basin. According to the characteristics of each cascade hydropower developing mode, the commonness and individuals of the impacts caused by cascade hydropower stations and a single hydropower station on ecological environment are compared and analyzed so as to find out the differences between them. On these bases, the fundamental regularities of the impacts of cascade hydropower exploitation on the ecological environment in the river basin, including the factor, type, process, extent and degree of the impacts, are clarified. In addition, the key ecological environment features influenced by cascade hydropower stations in the river basin are determined and therefore the factors used to estimate the impacts of cascade hydropower exploitation on the ecological environment are established, and the corresponding methods to obtain the ecological environmental factors based on remote sensing images are discussed. It is concluded that the spatiotemporal impacts of cascade hydropower stations in the river basin on the ecological environment are not the simple arithmetic summation of the impacts caused by all the single hydropower stations within the cascade, but a very complex nonlinear process, so it is necessary to use the special evaluation system of environmental factors different from that used for single hydropower station while estimating the impacts of cascade hydropower development in the river basin on the ecological environment.