



Automatic extraction of supply relationship between glaciers and lakes on the Tibetan Plateau

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Due to climate change, both the number and size of lakes on the Tibetan Plateau have generally increased during recent years. For quantitative study of this process, the detailed supply relationship between glaciers and lakes in this region is one of key datasets. However such a dataset still lacks, while the spatial distribution of glaciers and lakes have been available for this region. In this study we developed an automatic method of extracting supply relationship between glaciers and lakes. This method includes two stages. The first stage is to apply digital terrain analysis on the gridded digital elevation model to deriving the spatial distribution of flow direction and then to build a directed acyclic graph based on the flow path among boundary cells of glaciers and lakes. In the second stage, all direct or indirect supply relationship between glaciers and lakes can be extracted by searching this graph, according to user-specific options. The proposed method was used to extract the supply relationship between glaciers and lakes on the Tibetan Plateau in the early 21st century.