



Seasonal evolution of englacial and subglacial drainage system of temperate glacier revealed by hydrological analysis

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Englacial and subglacial drainage system of temperate glacier has a strong influence on glacier dynamics, glacier-induced floods, glacier weathering processes and runoff from glacierized drainage basins. Proglacial discharge is partly controlled by geometry of the glacial drainage network and by melt water production process. The glacial drainage system of some alpine glaciers has been characterized using a model based on proglacial discharge analysis. In this paper, we apply cross correlation analysis to hourly hydro climatic data collected from Hailuogou Glacier, a typical temperate glacier in Mt. Gongga, to study the seasonal change of status of englacial and subglacial drainage system by Q-T time lag analysis. During early ablation season (April-May) of 2003, 2004 and 2005, the change of englacial and subglacial drainage system usually leads several outburst flood events, which are also substantiated by observing the leakage of supraglacial pond and crevasses pond water during field works in April, 2008. At the end of ablation season (October-December), glacial drainage network become less hydro-efficiency. Those events are evidenced by hourly hydro-process near the terminus of Hailuogou Glacier, and the Q-T time lag analysis also can be a good indicator of those changes. However, more detailed observations or experiments, such as dye-tracing experiment and borehole water level variation recording, are necessary to describe the status and processes of englacial and subglacial drainage system evolution during ablation season.