Observation and simulation of hydrological response to global warming at Rongbuk Glacier, Mount Qomolangma, central Himalayas

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From 8 April to 11 October in 2005, hydrological observation was carried out at the Rongbuk Glacier catchment in the Mt. Qomolangma (Everest) region, central Himalayas. The melt water runoff from April to October accounted for about 80% of the total discharge in the observation period. Compared with the discharge data in 1959, the runoff in 2005 was much higher, with the runoff in June, July and August increasing by 69%, 35% and 14%, respectively. We sugget that the rising of temperature is the major factor causing the increase in runoff. The streamflow is able to be simulated well by HYCYMODEL, a stream flow forecasting model for mountain catchment basin, by inputting precipitation and air temperature data. The process of daily discharge is also well stimulated. Applying HYCYMODEL, the runoff made by snow and glacial melt water is estimated in different scenarios of temperature increase and precipitation variation in future.

Key words: Rongbuk Glacier, meltwater, global warming, HYCYMODEL