

# "Analysis of climate change impact on snowmelt and ice melt processes in the Shaluli Mountain plateau"

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## ▪ Sub-theme

1. Water-Human-Economy(Agriculture, Industry, City...)-Ecology Nexus under a Changing Environment

## ▪ Topic

1-1. Rules and mechanisms of natural hydrological cycling and socio-economic water cycling evolution under climate change

## ▪ Body

Climate change will affect snow and ice melting process in snow plateau and total inter-annual snow and ice storage in regions, which in turn affects water cycle process and change pattern, and the study of this change can provide a scientific basis for water resource management decision makers to plan and develop water resources rationally. This paper proposed a method to analyze the effects of climate change on plateau runoff. Monthly precipitation, runoff and temperature observations for 52 years from 1970 to 2021 were collected at the Zhuosang hydrological station and the meteorological station in Litang County. According to the characteristics of intra-annual runoff distribution in Litang plateau, the collected time series data were classified by month, dry season (November to April), flood season (May to October), and year. The Mann-Kendall test and linear trend method were used to analyze the effects of climate change on the streamflow and runoff process in the plateau of Litang County and applied to the Shaluli Mountain plateau area. The results show that the inter-annual variation and intra-annual distribution of precipitation in the plateau area of Litang County were not significant, and the temperature showed a significant increasing trend. The monthly, annual, dry season and flood season temperatures all showed an increasing trend, and the increasing trend of annual runoff and flood season runoff was not significant, while the increasing trend of dry season runoff was significant. The significant increase in temperature in the dry season enhanced the replenishment of runoff by snowmelt and ice melt, and the mutation in the dry season runoff sequence occurred around 1987. The increase of 17.4% in dry season runoff after the abrupt change is greater than the increase in flood season. The amount of snow and ice melting increased by 23.8 % in the dry season, and the percentage of dry season runoff to annual runoff increased from 20.1 % to 20.4 %.

## ▪ Keywords

Climate change, snow melt and ice melt, the effects of climate change on plateau runoff, the Mann-Kendall test