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## >> SYNTHESIZE MOUNTAINS OF KNOWLEDGE <<

## Submitted Abstract

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Abstract

Major perennial rivers of Nepal originate from the Himalayas and are substantially fed by snow and glacier melt particularly during the dry season of the year. However, global climate change has led to significant reduction in snowcover extent and accelerated glacier mass loss in the Himalayas in last past decades largely altering the timing, magnitude and distribution of seasonal runoff in snow-glacier-fed rivers. Thus the practical assessment and projection of the effect of snowcover extent and glacier changes on hydrological regime of the glacierized basins demand for reliable simulation of snow accumulation and melt, glacier mass balance and the evolution considering their interactions and feedbacks over time and space (Naz et al., 2014; Clarke et al., 2015; Huss and Hock, 2018; Rounce et al., 2020b) as well as uncertainty analysis associated with the climate models and scenarios, downscaling and bias correction approaches of climate data, input data for model calibration, model parameters and model structures (Panday et al., 2013; Nepal et al., 2017; Rounce et al., 2020b). This study aims to characterize and quantify the cascade of uncertainty in climate impact projections using CMIP6 ensemble on fresh water resources availability and distribution for effective climate change adaptation and mitigation strategies in the Himalayan catchments taking the Karnali River basin of Nepal as a case study . A well calibrated coupled glacier dynamics (Open global glacier model- OGGM) and a spatially distributed hydrologic model and a method for improving our understanding of effect of glacio-hydrologic model parameterization and regionalization alongside the climate models and climate change scenarios (RCPs) on the cascade of uncertainty is developed. The methods developed in this study can be implemented at both local and regional scale and the results can be used as a guide for water security and water resources management and to cope with compounding environmental challenges by water resources managers and stakeholders.

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