

>> **SYNTHESIZE** MOUNTAINS OF KNOWLEDGE <<

Submitted Abstract

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Abstract

In this study monthly Temperature Lapse Rates and basic downscaling technique of subtracting means are used to reconstruct temperature (T) series over East Rathong glacier by using multiple data sets from Automatic Weather Stations (AWS) at Himalayan Mountaineering Institute (HMI), Gangtok Indian Meteorological Department (IMD), Yuksum and climate model data. Precipitation (P) over glacier is estimated using Gangtok IMD data and downscaled climate model data. The precipitation from climate model data is downscaled using local scaling factor method. The precipitation computed is found to be in agreement with the precipitation data obtained from AWS at HMI base camp located near the glacier. Change in volume of 0.18 km³ (from 1962 to 2020) estimated using satellite data are used to construct Mass Balance (MB) series for the glacier. It is observed that the glacier is losing its mass with increasing temperature, Aerosol Optical Depth (AOD), from 0.1 in 1980 to 0.2 in 2020, and decreasing precipitation. Regression analysis of MB with T, AOD and P suggest that all three are important parameters which impact the MB of the glacier.