

## **Dynamic modelling for assessing the impact of climate change on the hydrological regime of Chenab basin, NW Himalayas**

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**Abstract** The projection of future climate variables from 2011–2040 was done by using the Statistical Downscaling Model (version SDSM 4.2) to downscale daily maximum and minimum temperature, and daily precipitation at two stations, Dhyangarh and Baghliar, in the study area. The results of the downscaled maximum temperature reveal that there is increase in temperature for both A2 and B2 scenarios, but the increase is greater with the A2 scenario for both stations. Similarly, downscaled minimum temperature also shows an increasing trend for both these stations but the increase in average annual minimum temperature is greater for Dhyangarh station than Baghlihar for both the scenarios. The result of downscaled precipitation reveals that precipitation does not manifest a systematic increase or decrease in any future time horizon for either the A2 or the B2 scenario. Irrespective of the maximum and minimum temperature, there is a decreasing trend of precipitation at the beginning of the rainy season (May and June) and increasing trend towards the end of rainy season (September and October) in both the stations for both the A2 and B2 scenario. The results obtained from the HBV-EC model indicate that for Baghlihar station, in June, July, August, there was a reduction in discharge by 4.0%, 5.3% and 5.5%, respectively, according to the A2 scenario, and of 2.8%, 4.4% and 5.2%, respectively, according to the B2 scenario for 2011–2040. For Dhyangarh station, the corresponding reductions are 4.2 %, 5.4% and 5.8%, according to the A2 scenario, and 3.9%, 5.1% and 5.5%, according to B2 for 2011–2040. Thus, the climate change shows the reduction of discharge in both the stations, but the reduction is more in the case of Dhyangarh station.

**Key words** dynamic modelling; climate change; general circulation models; HBV-EC model; Chenab basin