

## A Comparative Study of Regional Climate Models and Global Coupled Models over Uttarakhand

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**Abstract :** As a great physiographic divide, the Himalayas affecting a large system of water and air circulation which helps to determine the climatic condition in the Indian subcontinent to the south and mid-Asian highlands to the north. It creates obstacles by defending chill continental air from north side into India in winter and also defends rain-bearing southwesterly monsoon to give up maximum precipitation in that area in monsoon season. Nowadays extreme weather conditions such as heavy precipitation, cloudburst, flash flood, landslide and extreme avalanches are the regular happening incidents in the region of North Western Himalayan (NWH). The present study has been planned to investigate the suitable model(s) to find out the rainfall pattern over that region. For this investigation, selected models from Coordinated Regional Climate Downscaling Experiment (CORDEX) and Coupled Model Intercomparison Project Phase 5 (CMIP5) has been utilized in a consistent framework for the period of 1976 to 2000 (historical). The ability of these driving models from CORDEX domain and CMIP5 has been examined according to their capability of the spatial distribution as well as time series plot of rainfall over NWH in the rainy season and compared with the ground-based Indian Meteorological Department (IMD) gridded rainfall data set. It is noted from the analysis that the models like MIROC5 and MPI-ESM-LR from the both CORDEX and CMIP5 provide the best spatial distribution of rainfall over NWH region. But the driving models from CORDEX underestimates the daily rainfall amount as compared to CMIP5 driving models as it is unable to capture daily rainfall data properly when it has been plotted for time series (TS) individually for the state of Uttarakhand (UK) and Himachal Pradesh (HP). So finally it can be said that the driving models from CMIP5 are better than CORDEX domain models to investigate the rainfall pattern over NWH region.

**Keywords :** global warming, rainfall, CMIP5, CORDEX, NWH

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