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Climate variations of himalayas based on different whether conditions

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DESCRIPTION

Climate is the long-term typically 30 years weather conditions (temperature, precipitation, humidity, wind speed and direction) of a particular location. Climate change refers to any long-term deviation in climate parameters in response to natural and anthropogenic factors. Climate change is the most critical environmental challenge faced by humanity worldwide with serious implications on food and energy security, water resources, natural ecosystem dynamics and services and human health, etc. Since the preindustrial era, considerable changes were observed in the earth's climate system both at global and regional scales (Arora, 2020).

The warming observed during the last several decades of the 20th century is attributed to the increase in anthropogenic Greenhouse Gas (GHG) concentrations. The Intergovernmental Panel on Climate Change (IPCC) has projected an increase of 1.4˚C-5.8˚C in the global temperature. The impact of climate change over the Himalaya is of particular concern as the region is sensitive to climate variability. The Himalayan climate is mostly alpine but varies considerably with elevation from snow-capped mountains at higher elevations to tropical/ subtropical climates at lower elevations, with varied vegetation types across the entire Himalayan arc (Juhant and Bildstein, 2017). The Himalaya has an important role in governing global weather patterns. The Himalaya serves as a heat source in summer and heat sink in winter. The Himalaya-Karakoram and Hindu-Kush Himalaya (HKH), together with the Tibetan Plateau (TP), play a significant on the Asian summer monsoon system. With the increased emission, the coupled cryosphere and hydrological process of the Himalaya are under stress from the warming temperatures (Verma, 1985).

The increasing temperatures result in more evaporation thereby increasing the moisture content in the atmosphere, causing changes in the present and future precipitation patterns, both spatially and temporally. These changes in the precipitation regimes can adversely affect the availability of water for human use and irrigation purposes, especially during the dry season. Over the Himalaya owing to its complex topography, climate change has induced localized weather events like cloudbursts, snowstorms and high winds, etc. which pose a greater risk over the region. The frequent flood-inducing rain events at higher altitudes have the potential to accelerate glacier melting and potential glacier lake outburst floods, thus posing major risks of disasters in the region. Climate change is reported to have serious implications on Himalayan ecosystem services with negative impacts on mountain agriculture and agrobiodiversity. Besides, the climate change over the Himalaya has the potential to negatively affect the resilience to crop diseases as many crop species in the Himalaya are very sensitive to changes in temperatures induced by rising GHG concentrations (Yü, 2021).

CONCLUSION

Despite the fragility and sensitivity of the Himalaya to the changing climate, robust and long-term climate change estimates are inadequate because of sparse and discontinuous observations. Further, robust and reliable projections of climate over the Himalaya are crucial for the local and regional scale impact assessments. The rate of warming over the HKH region is considerably higher than the global average with much higher rates at higher compared to the lower altitude regions. The physical mechanisms driving the warming across the Himalaya are quite differential. Like the north-western Himalaya, an increasing trend in the temperatures has been reported over the central Himalaya during the last century. Analysis of the temperature data for two altitudinal transects of the Alaknanda catchment in the central Himalaya indicated warming temperature. The warming trend in the temperature was found to be statistically significant at a 95% confidence level over the study area.

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