

CLIMATE VARIABILITY, VULNERABILITY AND IMPACT OF CHANGE IN MOUNTAIN REGION

Sanjay K. Jain

R. D. Singh

Anju Chaudhary

National Institute of Hydrology, Roorkee, India

ABSTRACTS

Mountain environments are likely to be among the most severely impacted ecosystems as a result of climate change. If the temperature of the Himalayan region rises, there would be melting of snow and glaciers as well as the reduction of snow precipitation and snow covered area. This in turn will affect the availability of freshwater for natural systems and for human uses. Earlier melting leads to drier conditions with increased fire frequency and intensity. Mountain climates occur within the framework of the surrounding regional climate and are controlled by the same factors, including latitude, altitude, continentality, and regional circumstances such as ocean currents, prevailing wind direction, and the location of semi-permanent high and low-pressure cells. Mountains themselves, by acting as a barrier, affect regional climate and modifying passing storms.

The assessment of potential impacts of climatic change in mountain regions is particularly difficult because of the complexity of a number of interrelated factors in regions of complex orography. From the literature, it is evident that despite the numerous constraints that still exist, there is ample opportunity for understanding climate variability in mountain regions given the current research efforts, techniques and methodologies. A way forward would be the integration of GIS and remote sensing techniques with climatological and statistical techniques such as synoptic classification and downscaling techniques to understand the changes in the climate variables of the mountain regimes over time and space. The need for this level of detail of climatic investigation stems from the importance of mountains as pristine ecological regions and also their importance as sources of vital resources such as water.