The Indian Himalayan region has shown significant rise in mean air temperatures in the last few decades. Precipitation in winter has varied considerably all these years with increase in liquid precipitation and decrease in solid precipitation at all places except in the higher regions of Karakorum Himalaya. While lower Himalayan ranges have shown significant increase in total seasonal precipitation in the last three decades, the reverse is true for Higher Himalayan ranges. However, total seasonal snow precipitation has decreased everywhere except marginally in the Karakoram Himalaya. This may demand investigations on the role of aerosols brought about by weather systems affecting the Himalayan belt and that of anthropogenic aerosols and their impacts on the Himalayan cryosphere. It will also help in the study of changing temperature patterns. Deforestation and land degradation may have an impact on the precipitation variability, which needs to be investigated. The asymmetrical warming of minimum and maximum temperatures can also be attributed to factors like cloud cover, soil moisture and precipitation, feedback processes and land use/land cover, which is all interrelated with precipitation. The snow cover area has decreased everywhere in Indian Himalaya except in Karakoram where it has increased marginally. All this coupled with the increase in number of occurrences of extreme precipitation events in past few decades has brought in a new climatic shift, which may have far reaching consequences on human settlements and the geopolitical situation in the Indian Himalayan region in the near future.

Warming leading to reduced snowfall and recession of glaciers is likely to pave way for easy access through glaciated mountain passes, which seem impregnable at this time. With this development the accessibility to the farthest and remotest regions would ease leading to better mobility and placement of better equipment for defending borders. However, dryness in such high altitude regions may accelerate Himalayan desertification in many other regions of Himalaya. With the depleting snow cover area, the albedo of the region would decrease and may bring in weakening in radiative cooling effect, which has happened during 2001-2014 because of reduced snow cover and may pose a challenge in snow melt water use and flood prediction. What would be the consequence of such a situation would form an important research area in years to come bringing out consequences of different scenarios that may develop in the Himalayan region. At present snow cover variability over the region and its impact on the energy budget remains largely unknown.

Predicting and diffusing extreme weather events may be a future research area as no nation can afford the damages caused due to such events, which may eventually lead to funding on developing tools for modification of weather bringing about extreme situations. On the other hand, every drop of scarce melt water would be counted for by construction of many reservoirs in the Himalayas for the purpose of harvesting snow and strong control on its consumption and usage. An increase in rainfall amounts vis-à-vis snow and frequent rainfall events may prove very disastrous in the regions where the mountain’s soil cover is loose and dry. The rapid earth movement from mountain slopes would give rise to many other hazards downstream. Extreme winter weather situations may produce extensive avalanches, which may travel for kilometers to cause extensive damage in hitherto seemingly safe areas.

All this is a projection of the impact of climatic change in cryosphere region of Himalaya, and its geopolitical fallout consequently. While such situations can be modeled and projections drawn, an assessment of ground situation is largely missing. Though remote sensing data has helped immensely, yet there is a need to augment it with surface data. A comprehensive plan on monitoring cryospheric region of Himalaya either with dense network of automatic observatories or with dedicated crysopheric centered satellite observation systems is the need of the hour. Understanding of glacier response to changing ISM and westerlies with the help of satellite based mapping supported by field validation is also required.