The specter of climate change is leading to drastic alterations in the Earth’s cryosphere. With reference to the Himalayan Mountains, the analyses of the temperature data collected manually at different observatories during the period from 1866 to 2012 show significant rates of warming during the winter season (1.40C/100 years) than the monsoon temperature (0.60C/100 years) due to rapid increase in both, the maximum as well as minimum temperatures, with the maximum increasing much more rapidly. Annual rate of warming (1.10C/100 years) is abnormally higher than the global rate (about 0.70C/100 years) during this period. Studies have confirmed significant spatial and temporal variations in magnitude of winter as well as summer warming in different ranges. While windward side of the Pirpanjal and parts of Greater Himalayan and Karakoram ranges have shown statistically significant winter and summer warming, leeward sides of these ranges have not shown much change. The most remarkable finding of this study is the significant decreasing trend experienced at almost all stations above equilibrium line (>5300 m in altitude) in winter warming as well as winter precipitation in higher reaches of the Karakoram Himalayas in last three decades. This is attributed to prevalence of high albedo / permanent snow cover which appears to have influenced the micro-climatology by reduced snow/ice feedbacks. These studies have significant bearing on the mass balance of the glaciers in the region and the hydrological behavior of various river systems in the Himalayas.

Rising temperatures are also responsible for over-all degradation and reduction of permafrost with respect to its areal coverage and thickness.  In order to factor impact of rising temperatures, study with regard to decadal variability in Land Surface Temperature (LST) over Karakoram Himalayas was also undertaken. Landsat 5- TM data, both in visible and thermal bands, have been used to compute land surface temperatures (LST) in the present study. It is inferred from the study that the area experienced a decrease in snow areas with an increase in surface temperature of 0.690K per year. A distinct rise in LST values were found to be for slopes above 30 degrees. Mean LST computed for areas covered with glacier ice below273oK shows upward trend, indicating general rise in ground summer temperatures from 1991 to 2012. Warming-induced permafrost degradation has led to an increase in number of incidences of mass movements, snow avalanches and ice avalanches in the Karakoram Himalayas in the recent past.