Karakorum Anomaly - A myth or Reality

Studies have confirmed that the glaciers in the north-western Himalaya (NWH) were in a state of retreat in the last century. The larger glaciers appear to have receded at a comparatively lower rate than the glaciers with smaller length. This conforms to the global trend of the world’s mountain glaciers which have undergone negative mass balance and terminal recessions. The rate of recession of glaciers appears to have accelerated in the last three decades of the last century. Interestingly, during the same period, the rate of downward movement of some transverse or tributary glaciers in the Karakoram Himalaya has enhanced, causing them to surge.

From the 1920s to the early 1990s, most glaciers of the Karakoram Himalaya were also observed to diminish, except for some short-term advances in the 1970s and surges. However, in the late 1990s widespread evidence of glacier expansion was found in the central Karakorum in contrast to a worldwide decline of mountain glaciers. This anomalous behaviour, termed as ‘The Karakoram anomaly’, was first described in 2005 and has been attributed to prevalence of the “Karakoram Vortex” (KV), a large-scale atmospheric circulation system related to warmer (cooler) near-surface and mid-lower troposphere temperatures above the Karakoram in the western Tibetan Plateau (TP). Our studies in the Nubra Valley of the eastern Karakorum Himalayas have yielded some contrasting results which puts a big question over the very existence of “the Karakorum Anomaly”. Studies indicate substantial Elevation Dependent Warming (EDW) with increasing rate of warming with altitude up to certain altitude, both in winter as well as summer. Significant rate of warming in summer coupled with decreasing precipitation trends in winter point towards declining trends in mass balance of the glaciers in this part of the Karakorum Himalayas. Ground investigations on thinning of glaciers also indicate significant ice loss and their negative mass balance in the recent past. The most plausible explanation for few observed advancing glaciers could be that the rising temperatures may have enhanced the plastic deformation of their glacier ice. Since majority of them are transverse glaciers with high gradient, their downward movement as a result of enhanced plastic deformation appears to be mistaken as their advancement and positive mass balance.