

Abstract

Globally, climate change is altering the trends and patterns of cold regions. Glaciers are major source of fresh water in downstream regions and it is urgent to quantify impacts climate change on Glaciers. Karakoram region is selected as study region for this study as it is showing anomalous behavior from decades. It is necessary to study the behavior of glacial movement over the region. Linear discriminant analysis used to show four classes that are glacial ice snow debris and ice mixed debris and all the other classes. Glacial ice is the main focus of the study and it is clearly seen from 2000 to 2010 that glacial ice is continuously decreasing and from 2010 to 2020 it increases abruptly. The decrease from 2000 to 2005 and from 2005 to 2010 shows the decrease in glacial ice. This increase from 2010 to 2015 and from 2015 to 2020 shows the surging of Karakorum glaciers. So the inferred results from these two decades is that Karakoram is continuously showing anomalous is behavior they can surge abruptly at any time. It can also be seen that debris and ice mixed debris is also showing different behavior from 2000 to 2010 it decreases and from 2010 to 2015 and 2020 it increases the presence of debris cover over the glaciers can trigger surges, because debris cover can absorb heat differently and can increase the chances of glacial ice to move and eventually the glaciers advances and causes the phenomena of glacial surge. To quantify the consequences of surge, the volume of glacial lakes was calculated. Volume of 10 selected lakes of Karakorum Region was calculated. All of the lakes except Lake 2 shows inclining trend that indicates that the volume of these lakes will eventually increase in future years. Lake 8 was formed in 2015 and its volume increases in 5 years span. Similarly, Lake 9 was newly formed in 2020 with a significant volume. These lakes can possibly be dangerous for GLOF hazards.