

# Temporal analysis of the spatial extent of hispar glacier using TRMM and LST data

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## **Abstract**

The largest glaciers, besides the Polar Regions, are found in the Northern Asian mountain ranges of Pamir, Karakoram and Himalaya. The runoff from these glaciers feeds into Indus River in Pakistan which is the largest source of water supply for the entire country. The glaciers are sensitive to climate change and their spatial extent keeps fluctuating based on the climate conditions and topography. Satellite imagery indicates that there may be large spatial variations in the glaciers due to topography and climate dynamic. In order to quantitatively assess the relation of glacial extent with climatic factors, Hispar Glacier was selected as the area of study. Found in the Karakorum Mountains, Hispar Glacier is a 49 km long glacier which connects with the Biafo Glacier (63 km) at Hispar La Pass to create the longest glacial system in the world (besides Polar Regions). The area of interest was delineated from Landsat 8 image using ASTER DEM of 30 meter resolution. Three toolboxes, (1) Glacier Mapping Toolbox, (2) TRMM data processing Toolbox and (3) LST data processing Toolbox, containing a total of thirteen tools were created for the analysis. TRMM (Tropical Rainfall Mapping Mission) and MODIS Land Surface Temperature (LST) data between the period of 1998 and 2014 were used to examine temperature and precipitation patterns and compared with the glacial extent for different time period analyses.