LAKE INVENTORY DELINEATION OF GILGIT, HUNZA & SHINGO BASIN

ABSTRACT

Glacial lake outburst floods (GLOFs) occur when a lake dam (ice, landslide, bedrock. or moraine) suddenly fails or is breached, catastrophically releasing a large volume of water. These floods can have massive impacts on downstream river channel morphology, disrupt ecosystem equilibrium, and can destroy infrastructure, whether that be from the flood itself, the large movement of sediment, or a change in lake dynamics. Glacial lake inventories can be used to assess GLOF potential, and inventory time series provide insight into the development of these lakes through time. The objective of the study is to find the Lake Inventory delineation of Gilgit basin

INTRODUCTION

Water is the necessity of life; therefore, it is crucial to have a proper outlook on the hydrological cycle. Glaciers are the frozen form reservoirs of water. The glaciers of Gilgit Basin region are a source of fresh water for millions of people. To conserve water, proper assessment and monitoring of the hydrological cycle is crucial. Glacier inventory of Gilgit River Bain is formed to identify the glaciers and their attributes. which will help to monitor the changes in the basin. Pakistan is located in South Asia between 24°-37°N latitude and 66°-77°E. It hosts the triple point (unction) of three world famous mountain rages Himalayas. Karakoram and Hindukush in its north. There are more than 5000 glaciers feeding the Indus from 10 sub-basins through different tributaries ranging from few tens of meters to more than 70 km long. According to glacier inventory developed by ICIMOD in 2005 with the help of RS/GIS techniques, over this glaciated domain, there are about 2500 glacial lakes formed due to glacier melt waters and 52 of them were declared potentially dangerous for Glacial Lake Outburst Flood(GLOF).

STUDY AREA

In this study. three basins (Gilgit. Hunza and Shingo) were selected. The climate of the study area is cold and dry and glaciers are widely distributed and according to the recent glacier studies have revealed that most of the glaciers in the Karakoram are more stable than those in the Tianshan and southern slopes of the Himalayas. where glaciers have substantially retreated. In the Karakoram range, there are numerous large valley glaciers with lengths longer than 40 km. such as the Batura glacier (59 km), Baltoro glacier (63 km), and Hispar glacier (54 km), according to Randolph Glacier Inventory 6.0. The large surface areas of these glaciers create a favorable environment for supraglacial lakes. Furthermore, studies have reported the existence of many surge-type glaciers in the Karakoram range. These surge-type glaciers are originating factors for many types of blocked lakes and GLOFs. Map of study area is shown in Figure below.

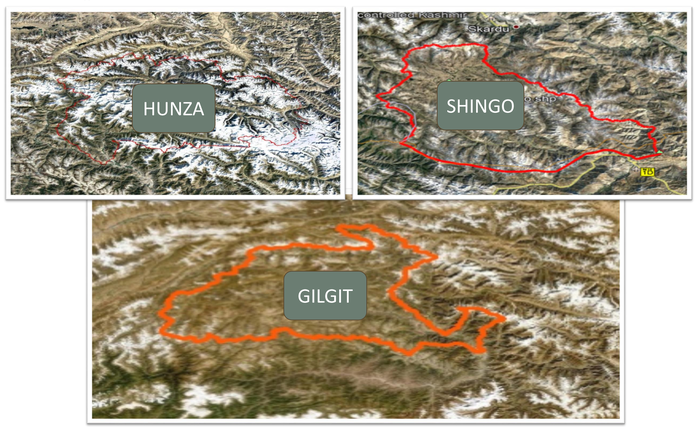

Figure 1.1: Study Area

MATERIALS & METHADOLOGY

Following are the methods which we use;

- DEM (Digital Elevation Model)
- Catchment Area.
- Sentinel Image.
- SRTM DEM

The representation of continuous elevation value over a topographic surface by a regular away of z-values, referenced to a common vertical datum. DEM are typically used to represent the bare-earth terrain, void of vegetation and manmade feature.

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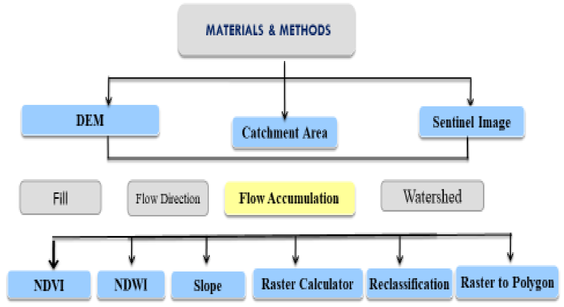


Figure 2.1: Flow chart showing research work methodology

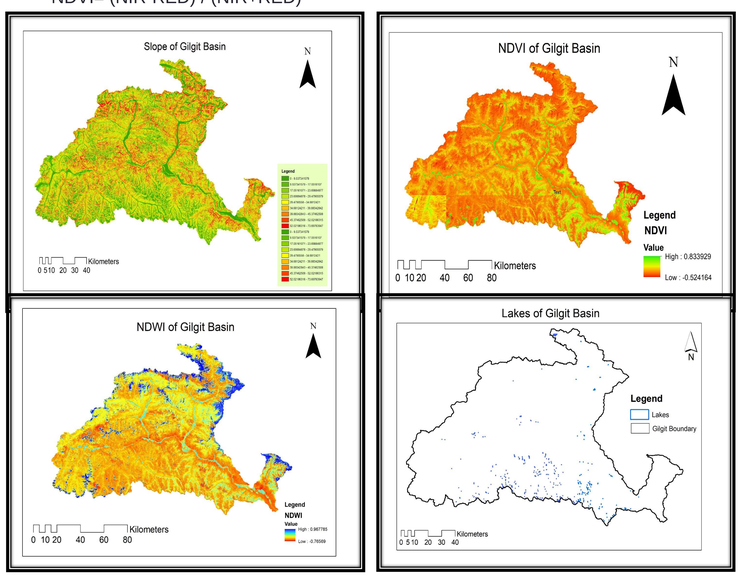
HYDROLOGICAL TOOLS

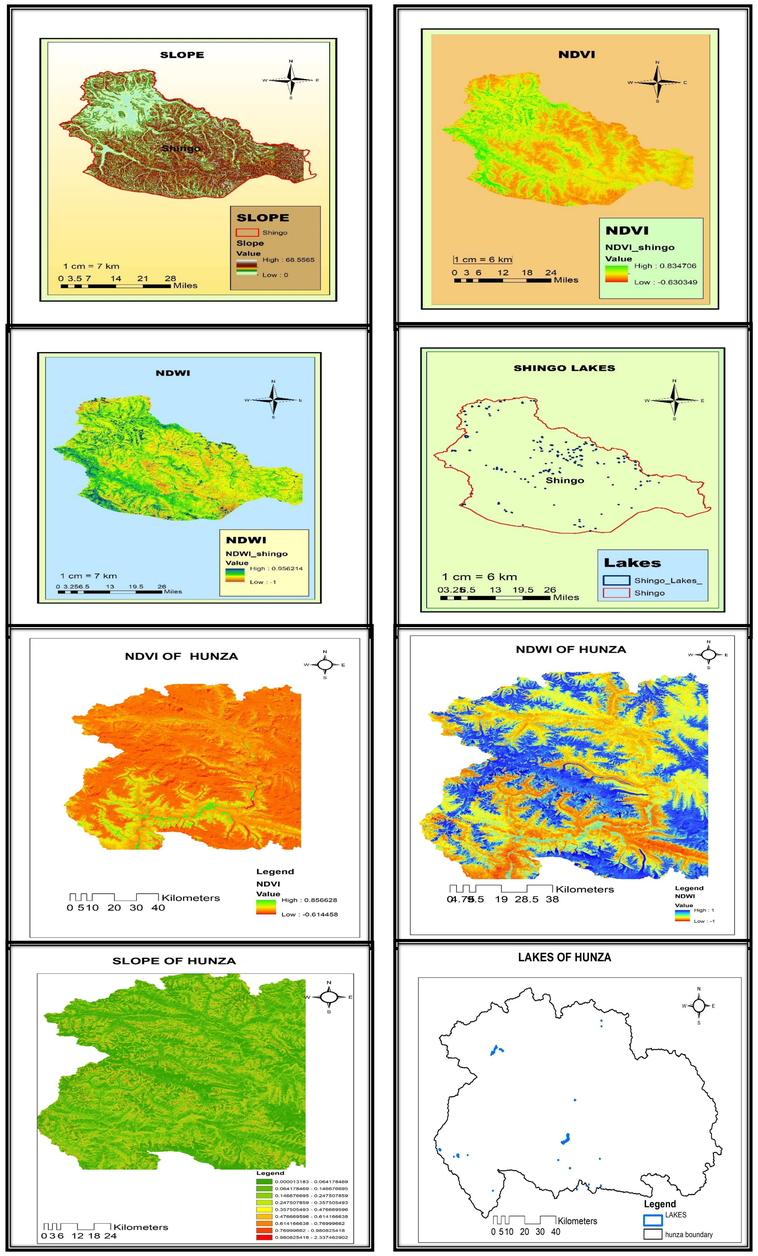
Following the hydrological tools used for this study and also there results are showing

- Fill:
- Flow direction: .
- Flow accumulation:
- Watershed:
- Catchment Area:
- NDVI:

  NDVI= (NIR-RED) / (NIR+RED)
- NDWI:

  NDWI= (GREEN-NIR) / (GREEN+NIR).
- Slope:
- Raster Calculator:
- Reclassification:
- Raster to Polygon





CONCLUSIONS

Lakes play an important role in sustaining the perennial water supply to downstream areas, in storing water, and in climate processes. Information about them is important for assessing regional water resources, hazard management applications, and climate change impact studies. The present study provides the delineation of the Gilgit, Hunza and Shingo Basin. It is formed manually by using high resolution and cloud free Sentinel images of 2017 and 2018. This can serve as a baseline for further research and quantifying changes due to climate change.