

Progress Report
Long-Term Monitoring of Gangotri Glacier,
Garhwal Himalaya
(April -June 2022)

By



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Background

The Himalayan Mountain Range contains thousands of glaciers of varying properties, which are spread over 37000 km² and a stretch of 2400 km from East to West. The glacier inventory by the Geological Survey of India indicates there are 9575 glaciers in the Indian Himalayan Region (IHR). It is well-established fact that changes in the glaciers are a key indicator of climate change; recent observation shows that snow accumulation is reducing while the ablation is increasing in the Himalaya. However, there are only a handful of ground-based studies on Himalayan glaciers. Therefore, the Department of Science and Technology (DST) has given Wadia Institute of Himalayan Geology (WIHG), Dehra Dun the mandate to monitor Himalayan Glaciers. Presently, Uttarakhand State Disaster Management Authority (USDMA) has sponsored a project entitled "Long-term monitoring of Gangotri Glacier, Garhwal Himalaya" to WIHG (Letter no. 1765/XVIII-B-1/21-12(5)/2021 dated 21.12.2021) for which the funds were allocated in March 2022.

The approved objectives of the project are the following:

- Mapping and monitoring of the Gangotri group of glaciers.
- Mapping and monitoring of glacial lakes in the Gangotri group of glaciers.
- Monitoring of meteorological (temperature, rainfall and snowfall) and hydrological (water level/discharge and sediment transfer) parameters throughout the year and identification of extreme events.
- Risk assessment of glacial hazards (GLOF, debris flow, flash floods, etc.) using an integrated approach i.e. meteorological, hydrological, seismological and satellite data.
- Dissemination of information to the local administration with regard to any emanating threat from the glacial hazards.

Based on the work plan submitted to USDMA, WIHG has carried out the following tasks from April to June 2022:

1. Permission for the establishment of meteorological, hydrological and seismological observatories within the Gangotri National Park from the district administration and forest department has been requested and awaited.
2. Permission for watch and wards to be stationed at Bhojwasa throughout the has been granted by the forest department (Gangotri National Park)
3. Appointment of two (02) watch and wards has been done and stationed at Bhojwasa for manual hydro-meteorological observations.
4. Advertisement for the recruitment of project staff (Project Scientist and Project Assistant) is open to applications till 20.06.2022.

5. Tenders for the manual meteorological observatory, 02 automatic weather stations (AWS), 01 automatic water level recorder (AWLR) and 02 broadband seismometers (BBS) will be finalized by the end of June 2022.

Based on the physical observations from the watch and wards, it has been indicated that the meltwater stream from Gangotri Glacier is originating near the left lateral moraine, flowing across the snout of the glacier (Gaumukh) before moving downward (Fig. 1). This flow across the glacier snout will enhance the melting of the frontal region of the Gangotri Glacier.



Fig. 1. Path of Bhagirathi River flowing across the snout of Gangotri Glacier.

Also, a fresh snowfall event (7 cm) was witnessed on 24th May 2022 at Bhojwasa. The fresh snow has already melted. To date, there is no imminent threat observed near the snout of Gangotri Glacier.