November, 2024

To,
The Additional Chief Executive Officer (Admin.)
Uttarakhand State Disaster Management Authority,
IT Park Sahastradhra Road

Subject: Monthly Progress Report for the Project "Long-term Monitoring of Gangotri Glacier, Garhwal Himalaya"

Reference: Letter No. 493/USDMA-2024 dated 7th June 2024 and email dated 04.11.2024 regarding the submission of a monthly report.

Dear Sir,

Regarding the above-referenced letter concerning the submission of the monthly progress report for the project titled **"Long-term Monitoring of Gangotri Glacier, Garhwal Himalaya,"** sponsored by the Uttarakhand State Disaster Management Authority (USDMA) and undertaken by the Wadia Institute of Himalayan Geology (WIHG) in March 2022. This project aims to map and monitor the Gangotri glaciers and their associated glacial lakes, collect meteorological and hydrological data, assess glacial hazards, and disseminate information regarding potential threats to The USDMA. In this context, we would like to inform you that a network of 2 Automatic Weather Stations (AWS), 1 Automatic Water Level Recorder (AWLR), and 2 broadband seismic stations was installed in the basin during October and November 2023.

The watch and ward team has obtained permission from the forest department to visit the base camps during winter. The analysis of snow cover in November, derived using Sentinel-2 satellite data, provides insights into spatial and temporal snow cover dynamics **(Annexure 1)**. The observed decrease in snow cover from **44% on 1st November to 38% on 21st November**, as detected through imageries, highlights its effectiveness in monitoring seasonal snow changes. This trend indicates a gradual reduction in snow cover, likely due to factors such as increased temperatures, decreased precipitation, or enhanced solar radiation during this period. The percentage of snow cover has been calculated for the basin area up to Bhojwasa. Specifically, between **1st November and 11th November**, the snow cover decreased from **44% to 41%, and from 11th November to 16th November**, it further decreased from **41% to 39%**. Finally, from **16th November to 21st November**, the snow cover decreased from **39% to 38%**, showing continued melting, likely due to increased temperature and clear sky conditions.

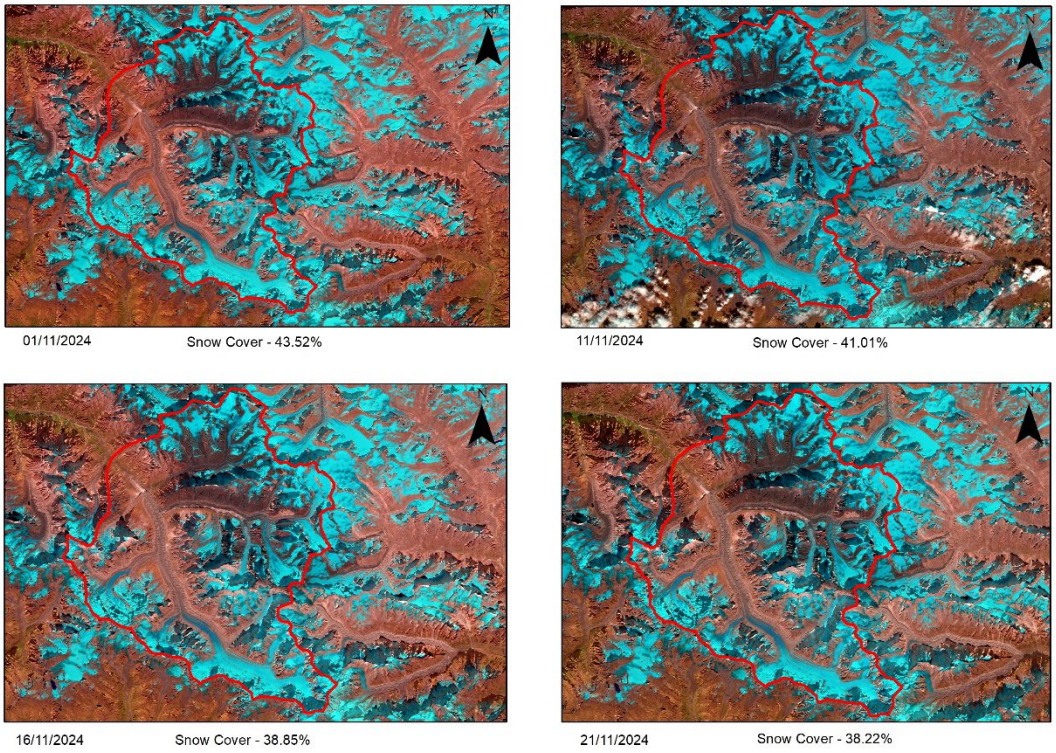
Additionally, observations confirm that no debris flow or lake development near the snout of the Gangotri Glacier during this period, indicating relative geomorphic stability despite the observed snow cover reduction. This information is essential for assessing seasonal glacier dynamics and related hazard risks.

Thank you for your attention to this matter.

Dr. Amit Kumar
Scientist C
Wadia Institute of Himalayan Geology, Dehradun

Annexure 1

November 2024 NDSI



Distribution of snow cover during the month of November 2024