

July, 2025

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

Subject: Reference to letter No. 493/USDMA-2024 dated 7th June 2024 and email dated 04.11.2024.

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 glacier 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 Two (02) **Automatic Weather Stations (AWS)**, One (01) **Automatic Water Level Recorder (AWLR)**, and Two (02) broadband seismic stations was installed in the basin during October and November 2023.

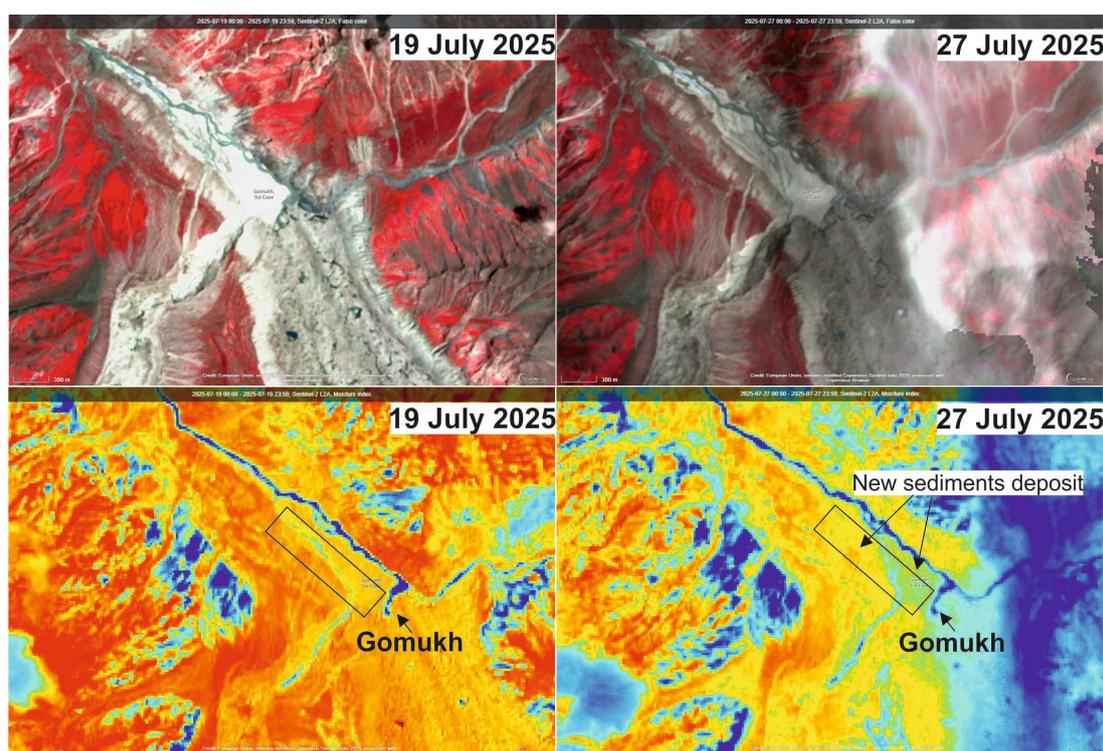


Figure 1. Satellite-based observations of changes near the snout of the Gangotri Glacier (Gomukh) during July 2025.

During the visit, it is observed that the glacier snout, along with the emerging Bhagirathi River, was clearly visible, with sediment-laden meltwater actively flowing downstream (**Figure 1**). Further, to validate the observed source of sediment transported, two cloud-free Sentinel-2 images acquired on **19th July and 27th July** was analyzed to assess recent changes in the region. The analysis indicates that sediments were transported primarily through a tributary channel or meltwater stream emerging from the Meru Glacier, leading to the deposition of coarse material in front of the Gomukh area. However, no significant direct impact on the Gomukh glacier snout was observed.

This interpretation is further supported by differences in surface soil-moisture conditions derived from moisture index analysis. The moisture index difference map clearly delineates zones of recent geomorphic activity, with enhanced moisture signatures corresponding to areas of active sediment deposition and reworked channel margins (**Figure 1**). The contrasts observed between the two acquisition dates indicate short-term surface reorganization driven by meltwater flow. In contrast, the absence of pronounced moisture anomalies at the Gomukh snout suggests that the snout remained largely unaffected during this period (**Figure 1**).

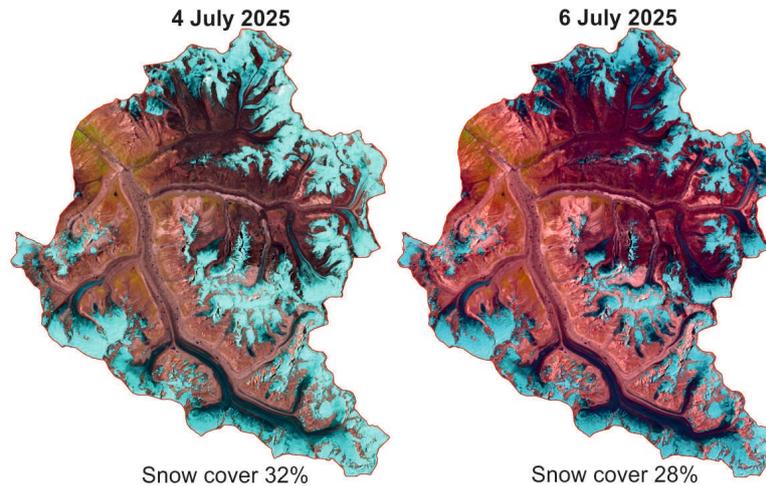


Figure 2. View of the Gangotri Glacier basin up to Bhojwasa, showing the distribution of seasonal snow cover during the month of July 2025.

To understand the melting conditions of seasonal snow, two only available cloud-free Sentinel-2 images acquired over a two-day interval were analyzed. The results show that the **snow-covered area (SCA)** decreased from **32% on 4th July 2025 to 28% on 6th July 2025**, indicating a **4% reduction within just two days (Figure 2)**. This rapid decline reflects accelerated seasonal snowmelt under prevailing melt-season conditions.

Continuous supply of material from the left-side moraines was observed, with sediments being deposited in front of Gomukh. However, this deposition did not have any significant impact on the Gomukh snout and was only associated with minor changes in the river flow direction. A decrease in snow cover was observed with the onset of seasonal melting, driven by gradually rising temperatures during July. The instruments installed at Bhojwasa and Chirwasa were found to be functioning properly, as verified during visits to all observatory sites. Additionally, satellite imagery was analyzed to identify any major events such as debris flows or the formation of new glacial lakes. Both field observations and remote sensing analyses confirmed the absence of debris flows, major glacial lake formation, or significant geomorphic disturbances in the vicinity of the Gangotri Glacier. However, a few small supraglacial lakes were observed over the ablation zone of the Gangotri Glacier.

Thank you for your attention to this matter.

Amit Kumar

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Scientist C

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