

February, 2025

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)

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 snow-covered area in the basin exhibited notable fluctuations throughout February, indicating a dynamic interaction between snowfall events, melting phases, and temperature variations. On **February 9, the snow cover was recorded at 66%**, suggesting moderate accumulation from previous snowfall events. This level of coverage indicates a relatively stable snowpack, though it may have been affected by gradual melting or sublimation due to higher-than-usual temperatures. **By February 15, the snow cover dropped significantly to 49%**, indicating a rapid melting phase. Such a drastic decrease is likely due to warmer-than-usual temperatures, increased solar radiation, which can accelerate snowmelt. Additionally, sublimation due to dry air and strong winds could have contributed to the reduction. The sharp decline in snow cover would have increased ground heat absorption, reinforcing a warming effect and further enhancing snow loss. **On February 25, the snow cover increased sharply to 74%**, suggesting a significant snowfall event or multiple precipitation occurrences within a short period. This increase aligns with potential Western Disturbances, which often bring moisture-laden air and heavy snowfall during this season. **By February 30, the snow cover further increased to 80%**, marking the highest recorded value in this period. Cloud cover is common in optical images, making it difficult to distinguish between snow and cloud. Therefore, this study selects nearly cloud-free images to calculate snow cover. However, based on observations and field experience, if a specific elevation is known to be snow-covered during a particular time, any cloud present over it can be assumed as snow. Similarly, if clouds are present over land, the same approach is used to classify it as a non-snow area.

This suggests continued snowfall or persistent cold conditions, leading to stable accumulation and reduced melting. **The seismic station installed at Maneri Dam functioned properly during February 2025, as confirmed by the watch and ward team during their visit to the instrument site on February 27 to ensure its operation.** The remaining instruments need to be checked in the first week of April by the watch and ward team. *Moreover, field observations and remote sensing analysis confirm that there were no debris flows, glacial lake formation, or significant geomorphic disturbances near the Gangotri Glacier during the observation period.* This suggests relative geomorphic stability, even though the snow-covered area increased.

Thank you for your attention to this matter.



Dr. Amit Kumar
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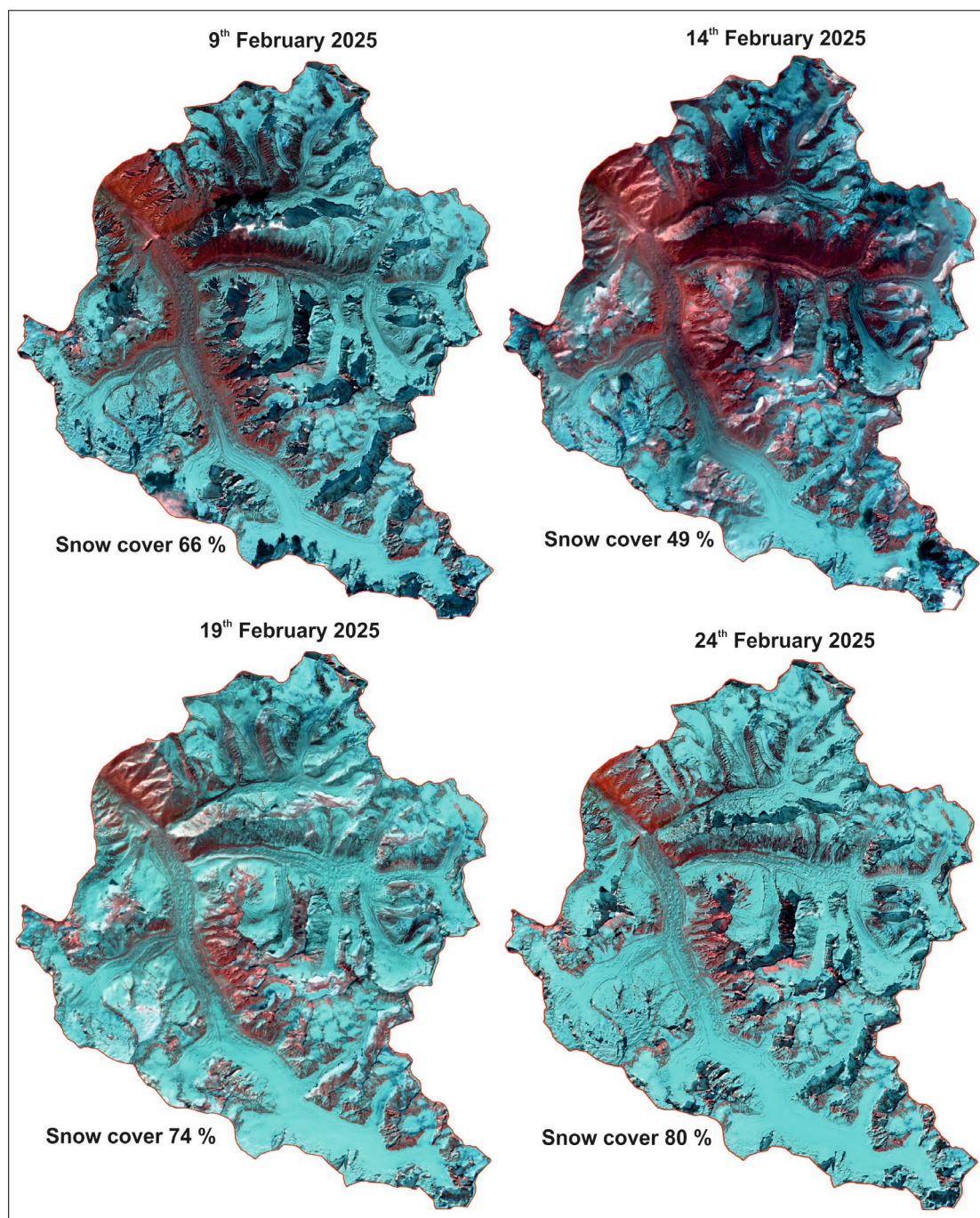


Figure: Distribution of snow cover during the month of February 2025