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Geochronological Investigations in Eastern Himalaya: A Case Study of Changme Khangpu Glacier, Sikkim

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Debnath, M. (*Geography, North-Eastern Hill University, Shillong, India*);
Sharma, M. C. (*Jawaharlal Nehru University, Professor, New Delhi, India*);
Syiemlieh, H. J. (*Geography, North-Eastern Hill University, Shillong, India*);
Kumar, P. (*Accelerator Mass Spectrometry and Pelletron, Inter University Accelerator Centre, New Delhi, India*);
Sharma, R. (*Accelerator Mass Spectrometry and Pelletron, Inter University Accelerator Centre, New Delhi, India*);
Chopra, S. (*Accelerator Mass Spectrometry and Pelletron, Inter University Accelerator Centre, New Delhi, India*);
Chowdhury, A. (*Geography, North-Eastern Hill University, Shillong, India*)

Glacier fluctuations are a key indicator of changing climate irrespective of any time period. Therefore, the practice of mapping of glacial and glacial landforms and classifying them according to common origin and age is mandatory for reconstruction of palaeoclimate of a glacier. This research provides the first preliminary understanding of Changme Khangpu glacier based on remote sensing and GIS tools along with field-based observation of landform-sedimentological properties. Further, geochronological evidence of landforms was aided by analysis of carbon isotopes using Accelerator Mass Spectrometry (AMS).

The steep valley slope restricted the preservation of glacial landscapes in the studied region. However, the well preserved latero-frontal moraine marked the oldest glaciation and therefore, taken as the highest extent of the present chronological study. Geomorphological reconstruction suggests an overall of two main cooling periods. The ^{14}C dating of the older sedimentation above the palaeo-snout indicates the beginning of deglaciation started from around 14300 Cal. BP. The glacier experienced successive thinning since highest glaciation and left the signature as a series of narrow lateral moraines. Deglaciation resulted in an around 1000 m long proglacial lake which was evolved around 1300 Cal. BP within the modified paraglacial landscape. The remnant of this glaciolacustrine deposition was again overlaid by continuous deposition of sediments derived from slope moraines and talus cones. During the Sebu lake breaching event (1970's) sediment displaced from the surrounding region and interrupted the sequence of deposits. The recent glacier is confined within the well-defined closed latero-frontal moraine, experiencing a slower rate of snout retreat but continuously thinning of thick debris-covered ablation zone. Although, this glacier was advanced extensively during the recent cooling period and left the signature as a huge recent latero-frontal moraine.

The recorded onset of the oldest deglaciation of debris-covered Changme Khangpu glacier was interrupted by the recent glacial advance. The landscapes between the oldest glacial limit and recent are continuously deforming under the various paraglacial processes.

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