

An approach to the formation of glacial lake in the debris covered glaciers

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ABSTRACT:

In recent decades number of Glacier Lake Outburst Floods (GLOF) events in Nepal Himalaya has increased dramatically causing serious damages to lives, properties, and infrastructures in the region. The development of increasing number of glacier lakes in Nepal Himalaya and their subsequent outburst is mainly attributed to ongoing global warming. Most of the glacier lakes in Nepal Himalaya are developed over debris-covered glacier due to the expansion of existing supra-glacial ponds in a time period of a decade or so. Physical environment found on the debris-covered glaciers are quite conducive for the formation of supra glacial ponds which sometimes grow into a large glacier lake when certain conditions are met. This paper presents possible mechanism of formation and growth of supra-glacial pond into a mature potentially dangerous glacier lake. The experimentally observed ablation rates under a debris layer of glacier are shown to validate the mechanism of the evolution of supra glacial ponds and its expansion to form a large glacier lake. An attempt is made to show the different energy components available and those acting as catalysts resulting in higher melting rates and faster growth of the supra glacier lakes.
