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Interdependence of glacier lake formation on glacier dynamics

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The debris covered glaciers in Himalaya region are classified under two types: glacier having a glacier lake in its terminus and glacier without a glacier lake. Understanding the critical conditions between these two types is very interesting topic for glaciology. Moreover, it may become the key topic for prevention of GLOF. In this study, we examine the interdependence of glacier lake formation on glacier dynamics using a numerical glacier dynamics model.

The flow field simulated using the topographical data of Imja Glacier, which has a glacier lake in its terminus, shows good agreement with the measurement results. Our model indicates the positive feedback between the glacier lake and its expansion, namely, the existence of the glacier lake accelerates thinning ice thickness near the terminus and thus the glacier lake will expand its size.

Keywords: Glacier lake formation, Glacier dynamics, numerical model