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GLOFs - The Next Generation

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In the central and eastern Himalaya, recent climate warming has resulted in the thinning and stagnation of debris-covered glaciers, and the formation of numerous moraine-dammed lakes. To date, the affected glaciers are mainly in relatively low-lying catchments, with accumulation areas rising to altitudes of up to ∼6,500 m. Examples include the Langmoche Glacier (origin of the 1985 Dig Tsho GLOF), and the Trakarding Glacier (retreat of which formed the well-known Tsho Rolpa lake). Potentially dangerous lakes have not been identified on glaciers with extensive high-altitude catchments, such as the Khumbu and Ngozumpa Glaciers. (The Imja-Lhotse Shar glacier system – in front if which is the Imja Lake - rises to over 8,000 metres, but is mostly much lower.) Glaciers with large accumulation areas at extreme altitudes have so far been partially buffered against the impacts of climate change, although satellite image analysis has shown that the lower reaches of both the Khumbu and Ngozumpa (and many similar glaciers) are undergoing sustained surface lowering, and are largely stagnant. Moreover, the rapid coalescence of supraglacial ponds behind the terminal moraine of the Ngozumpa indicates that the glacier is very close to the threshold for the development of a potentially hazardous lake. Even without any additional warming, it is likely that large lakes will develop on these and other high-elevation glaciers in the coming decades. The very low surface gradients of many of these glaciers means that such lakes could reach several km in length, with volumes one or more orders of magnitude greater than any now existing. Because the catastrophic drainage of lakes of this size could severely impact on communities located far downstream, it is imperative to identify the most at-risk glaciers at an early stage, and to formulate appropriate responses.