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Glacier Mass Balance measurements in Bhutan

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Long-term glacier measurements are scarce in the Himalayas, partly due to lack of resources as well as inaccessibility of most of the glaciers. There are over 600 glaciers in Bhutan in the Eastern Himalayas, but no long-term measurements. However, such studies are an important component of hydrological modelling, and especially relevant to the proposed expansion of hydropower resources in this area. Glaciological studies are also critical to understanding the risk of jøkulhlaups or GLOFS (glacier lake outburst floods) from glaciers in this region.
Glacier mass balance measurements have been initiated on a glacier in the Chamkhar Chu region in central Bhutan by the Department of Hydro-Met Services in co-operation with the Norwegian Water Resources and Energy Directorate. Chamkhar Chu is the site of two proposed hydropower plants that will each generate over 700 MW, although the present and future hydrological regimes in this basin, and especially the contribution from glaciers, are not well-understood at present. There are about 94 glaciers in the Chamkhar Chhu basin and total glacier area is about 75 sq. km. The glaciers are relatively accessible for the Himalayas, most of them can be reached after only 4-5 days walk from the nearest road. One of the largest, Thana glacier, has been chosen as a mass balance glacier and measurements were initiated in 2013. The glacier area is almost 5 sq. km. and the elevation range is 500 m (5071 m a.s.l. to 5725 m a.s.l.) making it suitable as a benchmark glacier. Preliminary measurements on a smaller, nearby glacier that was visited in 2012 and 2013 showed 1 m of firn loss (about 0.6 m w.eq.) over 12 months.