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Observed changes in glaciers in China

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Small glaciers are highly sensitive to changes in temperature and precipitation making them important indicators of regional climate change. At present, worldwide evaluation and prediction of glacier change are based on or aided by detailed observations from a small number of glaciers due to the inaccessibility of many glacier areas. Thus, the ground-based detailed glacier monitoring is of strong need and extremely important for glacier variability evaluation in both regional and global scale. China has 46,377 glaciers with a total area of 59,425 km2 and 5600 km3 in volume. Most of the glaciers have experienced rapid and accelerated shrinkage during last few decades. Although some of the glaciers have been investigated or observed through field expeditions and ground-based monitoring, the information of the glacier changes are poorly documented and relatively new to international community. This paper summarizes the observed changes of 9 reference glaciers in China: 1) Urumqi Glacier No. 1, located at the headwaters of Urumqi River in eastern Tianshan which is the best observed glacier in China; 2) Haxilegen Glacier No. 51, at Kuitun River in eastern Tianshan; 3) Qingbingtan Glacier No.72, located at the upper reach of Aksu River in the middle of Tianshan; 4) Miaoergou ice cap, located in the most east part of Tianshan; 5) Laohugou Glacier No. 12, located in Shule River in Qinlian Mountains; 6) Qi Yi glacier (also named as July First Glacier), located in Qinlian Mountains; 7) Dongkemadi Glacier located in Tianggula Mountains in Qinghai–Xizang (Tibetan) Plateau; 8) Rongbu Glacier at the north slop of Mt. Everest in Himalaya Mountains; and 9) Baishui Glacier No. 1, the only temperate glacier in this glacier group, located at Yulong Snow Mountain. Geographically those reference glaciers well represent the glaciers in the major high mountain system in western China. In addition, they have been monitored for 5-53 years and promise the best datasets for glacier changes in their regions.