



Glacier volume and mass balance in the Qilian Mountain, China, in recent years

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Glaciers are not only direct proxy for climate change, but also important water resources for heavy population in Central Asia. In China, many large rivers head from glaciers in mountains. Among those mountains, Qilian Mountain and its surroundings is characterized by small glaciers developed, dense population and extremely dry climate. Glaciers and snow melt water are heavily depended on in that area. Prohibited by limited studies on regional scale glacier behavior and its mechanisms, the significance of glaciers in Qilian Mountain is of debate. In this study, remote sensing, mass balance model and dynamic model are applied to (1) reconstruct area and mass loss of glaciers in the past 50 years and (2) predict them in 21st century, as well as (3) calculate current and future contribution of glaciers to local river stream. The results indicate glaciers in Qilian Mountain are more sensitive to climate change comparing to those glaciers in Tianshan and other mountains in Tibetan Plateau. One of the main reasons for that is the smaller mean glacier size. Certain part of glaciers in Qilian Mountain are predicted to vanish in very near future with climate change scenarios published in IPCC AR5 as climate forcing. We also supply proof for significant contribution of glaciers to local river runoff, even with the coverage of glaciers in the whole mountain range and surroundings less than 5%.