

Changes of the Monsoonal Temperate Glaciers in China during the last Several Decades

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Abstract: Based on various data, changes of climate, glaciers and runoff in China's monsoonal temperate glacier region have been studied in this paper. It indicated temperature has increased in a fluctuating manner during the last several decades, and temperature rise has accelerated since the 1980s, while the net accumulation of Dasuopu ice core always kept the decline trend in the last 100 years, and what's more, the precipitation decrease was also obvious between 1960s and 1990s in China's monsoonal temperate glacier region. As response to climate change, eight monsoonal temperate glaciers were in stationary or advancing between the 1900s-1930s and the 1960s-1980s, and were in retreat from the 1930s to the 1960s and from 1980s to present. Ablation is heavy in glacier tongue area, which can be confirmed by the fact that a mean ablation water equivalent of 876mm in Hailuogou glacier between 1990/91-1997/98, which was much higher than that in 1982/83 and equal to an increased ablation depth 1.4m a^{-1} of the bare ice area from 1983/84 to 1990/91. Mass balance records also shown that glaciers had suffered a constant mass loss of snow and ice, with the accumulated mass balance of -10.83m water equivalent in the Hailuogou basin in Mt. Gongga during the past 45 years and that of -11.38m water equivalent at the Baishui glacier No.1 in Mt. Yulong during the past 52 years, respectively. The total glacier area have reduced by 3.11 km^2 with a front altitude rise of 3.2m y^{-1} and 4 glaciers have disappeared in Mt. Yulong between 1957 and 1999. Under the background of climatic warming, the altitude of glacier equilibrium line has been rising and change of the glaciers' surface morphology has occurred since the 1980s, such as enlargement of glacier melted lake and more ice-rock falls in snow/ice covered areas.