

## **Snow and Glacier Change of China During Last 40 Years**

Liu Shiyin, Guo Wanqin, Li Jing, Xu Junli, Yu Pengchun, Wei Junfeng

*State Key Laboratory of Cryospheric Science, Cold and Arid Environmental and Engineering*

*Research Institute, Chinese Academy of Science*

We investigated snow and glacier changes of China. The snow change is derived by using the SMMR(1978-1987)&SSM/I(1987-2005) dataset released by Environmental and Ecological Science Data Center for West China, and the glacier areal change is deduced by the first and second glacier inventory data of China. We also studied the voluminal change of some glaciers in Qilian Mountains based on topographical DEMs of 1060s and ASTER GDEM around 2000. The current results show that the snow and glaciers in China have experienced distinctive changes during last decades.

The snow change of China is featured by increases in snow depth and snow coverage. The annual mean and maximum snow coverage was increased impressively during 1979-2005, with the mean annual snow coverage increased from  $\sim 15\%$  in 1980s to  $\sim 23\%$  after 2000, and the maximum annual snow coverage increased from  $\sim 40\%$  to  $\sim 67\%$ . The annual accumulative snow depth (sum of daily snow depth) also increased fluctuately, with the two typical stage can be clearly distinguished. The first stage is 1979 to 1991, with a mean annual accumulative snow depth of 388 cm. In the second stage (1992-2005), the mean annual accumulative snow depth increased to 486 cm.

The glacier area of western China was largely decreased during 1960s-2005. The total glacier area change of western China is about -13% according to current glacier inventory results. The distribution of glacier shrinkage shows very distinctive spatial pattern. The minimum change occurs at northern Tibetan Plateau, and the change rate enlarged with distance from this center. The maximum change rate appeared in Altai region. The Tienshan and Qilian Mountain region also show larger change. Lots of small glaciers that mainly located at regions such as Altai, Qilian Mountain and Northwestern Tibetan Plateau were disappeared, while glaciers in some regions show an advancing tendency, which mainly occur at Karakorum Mountains. The result of glacier voluminal change study in Qilian Mountain shows that more than

60% of the glaciers thickened in accumulation area and thinned in ablation area, while the others thinned or thickened in both accumulation area and ablation area, indicating that the volume of glaciers in western China were also changed dramatically.