

# **Existing Glaciers, Water resource and Climatic Environment Change in the Area of China Himalaya**

Qin Dahe

(Lanzhou Institute of Glaciology and Geocryology and the Bureau of Science and Technology for  
Resources and Environment,  
Chinese Academy of Science)

## **Abstract**

Himalayas, the huge mountain chains with 2400km long from east to west, is a great center of existing glaciation in lower latitudes of the earth, with about 50 high peaks in the height of over 7000m (a.s.l) and 10 peaks over 8000m(a.s.l). It is a natural barrier to stackle the humid air masses from the south Asian monsoon. Therefore, the scale of existing glaciers in the south slope is bigger than that in the north. For example, the equilibrium line of Kongbu Glacier in the north slope of Qomulongma reach to 5800-6000m a.s.l while down to 5500-5600m a.s.l in the south slope. The total area of existing glaciers in the whole mountain chains is about 30000km<sup>2</sup> but only 11055km<sup>2</sup> in China territory and mainly scattered on the several high peaks. In the 5000km<sup>2</sup> Qomulongma, scattering 4 Peaks over 8000m a.s.l and 38 peaks over 7000m a.s.l, the total glacial area is about 1600km<sup>2</sup> by the calculated in 1:100,000 topography published in UK in 1951, of which 772.32km<sup>2</sup> is scattered in the north slope, 685km<sup>2</sup> in the south slope, and 100km<sup>2</sup> in the west part of Qomulongma area.

Glacial meltwater is important part of water resource in West China. The total runoff discharge of glacial meltwater in China can reach to  $560 \times 10^8 \text{ m}^3/\text{a}$ . Water storage of glaciers in Qomulongma area is up to  $1326.02 \times 10^9 \text{ m}^3$ . The special character of glacial meltwater runoff changes is depending on the climate changes. In the rain-rich years, temperature in mountainous region is lower and limits glacial melt, which is resulted in the smaller contribution of glacial meltwater runoff to rivers. On the contrary, contribution of glacial meltwater runoff to river is lager and the discharge of river runoff is increase. Changes of glacial water resource directly reflect the cases of climate fluctuation. In general, changes of most glaciers in Himalayas showed the retreat trend in the last ten decades, reflecting the global climate warming. Meanwhile some different cases also existed in different areas. The end of Rounbu Glacier on the north slope of Qomulongma located on the same position from 20's to 70's of this century. But thickness of the glaciers was thinning clearly. In the period of megathermal(6000-3000 a.B.P), mean annual temperature was 2°C higher than present, and the end of Rounbu glacier was 700m higher than present.