



## **Glacier and lake variations in some regions on Tibetan Plateau using remote sensing and GIS technologies**

**Q. Ye (1,2), T. Yao (1,3)**

(1) Institute of Tibetan Plateau Research, Chinese Academy of Sciences (CAS), Beijing 100085, China, (2) State Key Laboratory of Remote Sensing Science, Jointly Sponsored by the Institute of Remote Sensing Applications of Chinese Academy of Sciences and Beijing Normal University, Beijing 100101, China, (3) State Key Laboratory of Cryosphere and Environment, CAS, Lanzhou 730000, China (yeqh@itpcas.ac.cn / Fax : 86-10-62849886 / Phone: 86-10-62849397)

Extensive studies have found that glacial retreats occurred widely and asynchronously across the Tibetan Plateau due to the warmer climate, glacial lakes have increased much in the recent years. Studying spatial and temporal co-variances of glaciers and lakes would help us understand the impact of climate change on Tibet.

We use a series of satellite images and topographic maps in our studies on Tibet glaciers. Our results show that areas of both glacier retreat and advance exist in the middle and western Himalaya Mountains. Retreat dominates and accelerates through time in the two regions. Glaciers in the south and southeast are retreating faster than those in the northwest. The glacier decrease of 9.8% in the Mt. Qomolangma in 1974-2003 and 8.4% in the Mt. Naimona'Nyi region in 1976-2003 are dramatic compared with the Mt. Geladandong region of central Tibet in 1969-2002 (4.8%), which are faster than the average glacier recession in High Asia since the 1960s (7%).

Glacier and lake variations in the Mapam Yumco Basin (covers 7786 km<sup>2</sup>) and Yamzhog Yumco Basin (covers 8840 km<sup>2</sup>) were studied by series of spatial data from topographic maps and digital satellite images. The results indicate that decreased lakes, retreat glaciers, enlarged lakes and advance glaciers co-exist in the Basins during the last 30 years. Glacier recession was accelerated in recent years, and an accelerated lake enlargement with more water supplies from speeding melt glaciers.

Study on Rawu co catchment indicates that the Rawu co has been enlarged by 8% in area with 5% retreat of glaciers in 1974-2001. Also, our research on a catchment of two glacial lakes, Pida and Longbasaba, shows that the glacial lakes have increased 131.5% in recent thirty years with accelerating enlargement, while the area of glaciers nearby are retreating faster and faster.

It indicates that glacier recession in Tibet was accelerated in recent decades due to warmer climate. Lake changes were rapid and great, which relates to the change relationship between precipitation, evaporation and the increased water supply from melting glaciers and frozen ground. Our results suggest that climate warming might be the control cause for accelerated glacier and lake variations in the inland basins at high elevation on Tibetan Plateau.