Institute of Tibetan Plateau Research
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Outline

The Institute of Tibetan Plateau Research (ITP) was founded by the Chinese Academy of Sciences (CAS) in 2003. It aims to better understand the uplift of the Tibetan Plateau and its climate and environmental changes, as well as enhance sustainable development in the region. ITP has three campuses in Lhasa, Beijing and Kunming, respectively, and operates the Tibetan Observation and Research Platform (TORP) which comprises five field stations on the Tibetan Plateau, namely, the Namco Monitoring and Research Station for Multispheric Interactions; the Southeast Tibet Observation and Research Station for the Alpine Environment; the Qomolangma Atmospheric and Environmental Observation and Research Station; the Muztagh Ata Westerly Observation and Research Station; and the Ngari Desert Observation and Research Station. These facilities make long-term, continuous observations of geophysical, atmospheric and tectonic phenomena to understand land surface processes and environmental changes on the Tibetan Plateau. In addition, ITP has one field network to monitor persistent organic pollutants, one to study stable isotopes in precipitation, and one seismic network to study the deep structure of the Earth and seismicity across the Tibetan Plateau.

Through global recruitment, ITP has attracted over 240 permanent employees, including 36 professors, 62 associate professors, 54 technical personnel, 20 management staff and about 68 junior employees. Among ITP's research staff, one is a CAS member, four are principal investigators for projects sponsored by the National Basic Research Program of China ("973" Program), and several are working on the editorial boards of internationally renowned journals. ITP's research staff also includes nine recipients of the National Natural Science Foundation of China (NSFC) Fund for Distinguished Young Scholars Award, and seventeen CAS Hundred Talents Program fellows. NSFC Creative Research Groups have been formed to target research areas such as the Tibetan Plateau environmental changes and land surface processes, continental collision and Plateau uplift and alpine ecology and biodiversity. ITP has Ph.D. programs in physical geography and tectonics. Currently, about 142 young scholars are pursuing master's or doctoral degrees and 26 postdoctoral researchers are working at ITP.

Research Achievements and Challenges

Influences of glacial variation on the environment over the Tibetan Plateau have been studied since the founding of the institute. Field studies are one of the research features of ITPCAS. Large-scale ground observation and monitoring of glacial mass balance has been conducted over the Tibetan Plateau and its surroundings since 2004. Together with satellite images and remote sensing data, they help provide an updated scenario of glacial status in the region. According to the latest study by ITPCAS scientists, glacial mass balance over the Tibetan Plateau and its surrounding regions features heteregeneous variation pattern, with the largest retreat of glaciers in the monsoon-dominated southern part, moderate retreat in the central part of transition, and the least retreat, or even slight advance in the westerly-dominated northern Tibetan Plateau. The accelerated glacial melting and retreat in the southern and southeastern parts of the Tibetan Plateau has thus gained significant attention by the government, as this region gives birth to several glacial-dammed lakes yet witnesses busy trade businesses between Chinese and Nepalese. To advise the local government on the sustainable development is also one of the features of ITPCAS. Field survey and measurement have therefore been intensively conducted in glacial lake areas in the southern Tibetan Plateau since late 2012, focusing on the glacial lake dam structure, glacial lake runoff and the feeding glaciers status (Figure 1). One dimensional hydrological modeling was developed to simulate the peak discharge during the flooding. Together with satellite data and historical archive, the comprehensive study reveals great potential of glacial lake outburst floods in the southern Tibetan Plateau due either to the collapse of the feeding glacier, or the sub-moraine glacier melting (Figure 2). Those floods will pose potential threat to the security of the office buildings and Sino-Nepal Friendship Bridge nearby. Adaptation strategies are thereupon proposed for the safety of the Zhangmu pass at the Sino-Nepal border, including the regularization of in situ observation and monitoring of glacial lakes, establishment of an early warning system to reduce the risk, conduction of necessary engineering approaches to drain the water of the lake, construction of protecting embankment and diversion canals, and knowledge transfer to the people living in the region.

ITPCAS sees the major research challenges for the future in interdisciplinary research for natural disaster risk reduction.

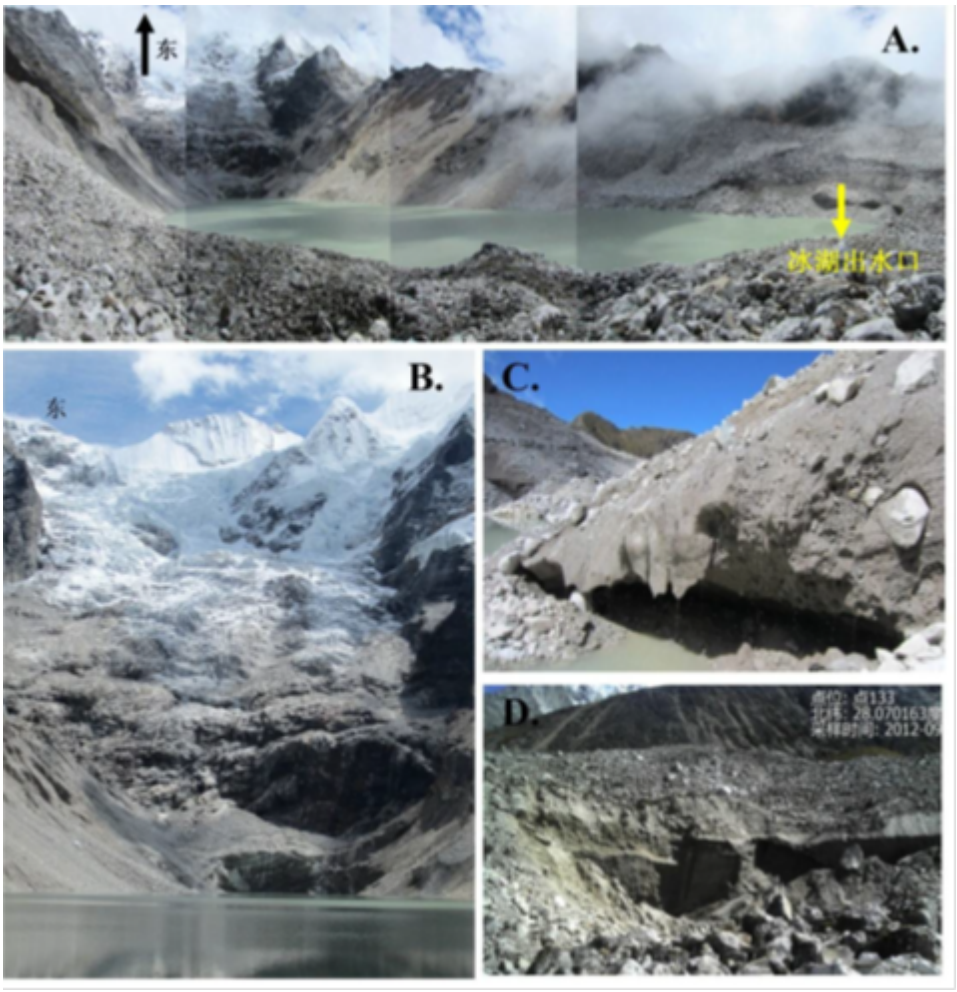

Figure 1 a) a bird-view of the Cirenmacuo glacial lake; b) its feeding glacier; and c) debris cover in the lake outlets.

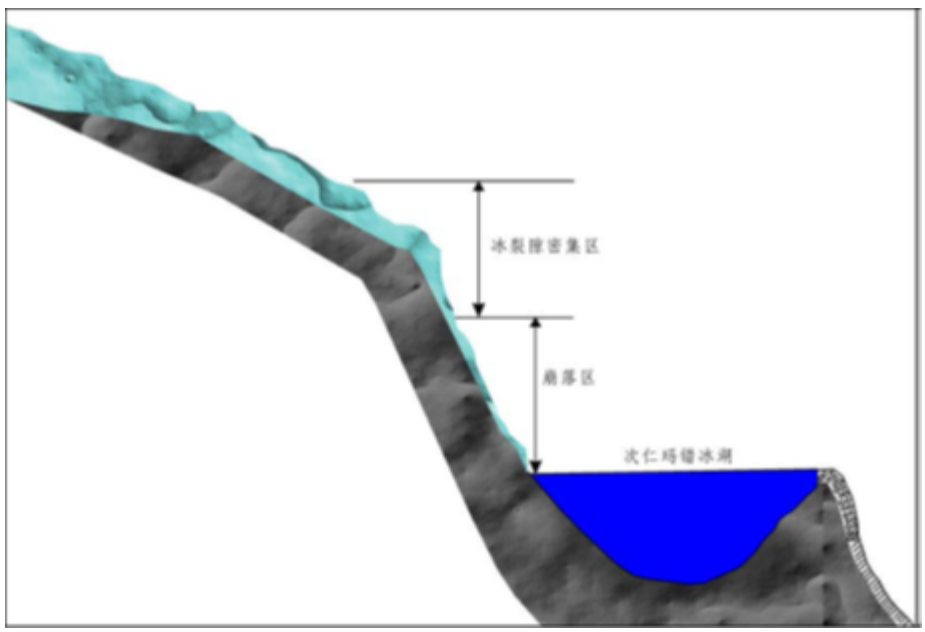

Figure 2 Vertical profile of the Amaciren glacier