A Review of the Monitoring of Mountain Glaciers in China

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Glaciers are a major feature in high mountain regions of west China. The first Chinese Glacier Inventory (1st CGI) shows there are 46 377 glaciers with a total area of 59 425 km^2. According to the climatic and topographical conditions or glacier physical properties, glaciers in China have been divided into three types: maritime (monsoonal) temperate glaciers, sub-continental (sub-polar) glaciers and extremely continental (polar) glaciers. The beginning of the Chinese glacier inventory was the investigation of glaciers in the Qilian Mountains in 1958, which was carried out by a team on Utilization of Snow and Ice Resources in Mountain Regions of China, Chinese Academy of Sciences (CAS). In 1959, the first glacier monitoring station of China was build up at Urumqi Glacier No.1, named as Tianshan Glaciological Station. The observations in the Glacier No. 1 have been periodically published on the Fluctuation of Glacier (one issue every 5 years) which was edited by the International Association of Hydrological Science (IAHS), the United Nations Environment Programme (UNEP) and the United Nations Educational, Scientific and Cultural Organization (UNSCO). Since 1970s, several subsequent glacial investigations or short-term observations in different mountain regions, especially in Tibet Plateau, were expanded. During the Scientific Expedition to the Qinghai-Xizang Plateau (1973-1980), main information of modern glaciers and quaternary glaciations in some mountain regions of Tibet Plateau were investigated by field expeditions. In 1990s, detailed monitoring of monsoonal temperate glaciers in Hengduan Mountains, east edge of Tibet Plateau, were carried out during the Comprehensive Scientific Expedition to Qinghai-Xizang Plateau in Hengduan Mountains and the Sino-USSR Joint Glaciological Expedition to Mt. Gongga. Based on those different scientific expeditions, several glaciers with different type in China were detailed but intermittently monitored, including glacier mass balance, glacier physical characters, glacier hydrology et al. The 1st CGI was as a participation of a workshop on the World Glacier Inventory in Switzerland organized by the International Commission on Snow and Ice (ICSI) covered nearly 24 years between 1978 and 2002, which was mostly based on aerial photographs or topographic maps. More recently, a new project has been endeavored to compile a second Chinese glacier inventory (2nd CGI) based on optical remote sensing imageries, which was within the framework of the Word Glacier Monitoring Service (WGMS) and the Global Land Ice Measurements from Space Project (GLIMS). At the same time, some typical glaciers were remonitored by stations.