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# Coordinative Remote Sensing Observation Technology for a High Altitude Barrier Lake

**Authors :** Zhang Xin

**Abstract :** Barrier lakes are lakes formed by storing water in valleys, river valleys or riverbeds after being blocked by landslide, earthquake, debris flow, and other factors. They have great potential safety hazards. When the water is stored to a certain extent, it may burst in case of strong earthquake or rainstorm, and the lake water overflows, resulting in large-scale flood disasters. In order to ensure the safety of people's lives and property in the downstream, it is very necessary to monitor the barrier lake. However, it is very difficult and time-consuming to manually monitor the barrier lake in high altitude areas due to the harsh climate and steep terrain. With the development of earth observation technology, remote sensing monitoring has become one of the main ways to obtain observation data. Compared with a single satellite, multi-satellite remote sensing cooperative observation has more advantages; its spatial coverage is extensive, observation time is continuous, imaging types and bands are abundant, it can monitor and respond quickly to emergencies, and complete complex monitoring tasks. Monitoring with multi-temporal and multi-platform remote sensing satellites can obtain a variety of observation data in time, acquire key information such as water level and water storage capacity of the barrier lake, scientifically judge the situation of the barrier lake and reasonably predict its future development trend. In this study, The Sarez Lake, which formed on February 18, 1911, in the central part of the Pamir as a result of blockage of the Murgab River valley by a landslide triggered by a strong earthquake with magnitude of 7.4 and intensity of 9, is selected as the research area. Since the formation of Lake Sarez, it has aroused widespread international concern about its safety. At present, the use of mechanical methods in the international analysis of the safety of Lake Sarez is more common, and remote sensing methods are seldom used. This study combines remote sensing data with field observation data, and uses the 'space-air-ground' joint observation technology to study the changes in water level and water storage capacity of Lake Sarez in recent decades, and evaluate its safety. The situation of the collapse is simulated, and the future development trend of Lake Sarez is predicted. The results show that: 1) in recent decades, the water level of Lake Sarez has not changed much and remained at a stable level; 2) unless there is a strong earthquake or heavy rain, it is less likely that the Lake Sarez will be broken under normal conditions, 3) lake Sarez will remain stable in the future, but it is necessary to establish an early warning system in the Lake Sarez area for remote sensing of the area, 4) the coordinative remote sensing observation technology is feasible for the high altitude barrier lake of Sarez.

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