

Glacier lake and glacier lake outburst floods in Tien Shan and Ladakh Range

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As a result of recent glacier melting, present glacier lakes develop rapidly at glacier fronts in Tien Shan Mountains, Central Asia and Ladakh Range, Indian Himalayas. Although glacier lakes in the Tien Shan and Ladakh Range are small, compared to those in the eastern Himalayas (Bhutan and eastern Nepal), several GLOFs in the past have caused fatalities and serious damage to infrastructure and crops. With recent changes in the development of glacier lakes in these mountain regions, floods are becoming an increasing threat to local residents. However, the current status of glacier lakes is poorly characterized in this region. In this study, we researched glacier lakes in the Tien Shan Mountains and Ladakh Range using high-resolution ALOS/PRISM-AVNIR-2 images taken in 2007-2010. In addition, we report the characteristic of glacier lake and glacier lake outburst floods (GLOFs) in Tien Shan, using investigation of the appearance of glacier lake and GLOFs in the past.

We examined about 1600 glacier lakes ($>0.001 \text{ km}^2$) in the Tien Shan. Although glacier lakes are distributed throughout the Tien Shan Mountains, regional differences in their number and size are large. Larger glacier lakes are found in the Teskey and Ili-Kungoy regions, whereas most small glacier lakes occupy other mountain ranges (4000-5000 m asl), such as the Pskem, Talas, and Kyrgyz Ala-Too ranges. In seven mountainous regions, many present-day glacier lakes have appeared since the 1980s. Glaciers in these mountain regions are most glacier shrinkage area in Tien Shan over the 30 years, and these glacier lakes appeared after glacier shrinkage area. We report our results in detail in JpGU meeting.

Keywords: glacier lake, glacier lake outburst floods, small-size glacier lake region, Tien Shan, Ladakh Range