

Monitoring of interannual variabilities of glacial lakes at the end of A'nyemaqen glacier utilizing Pol SAR images

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ABSTRACT

Due to climate change in recent years, the degradation of most glaciers on the Qinghai–Tibet Plateau has accelerated the expansion of glacial lakes. Based on the polarization entropy difference between water and non-water signals, this paper studies the classification method of glacial lake in snowmelt period by using the dual-polarization time series synthetic aperture radar (SAR) images as data sources, and proposes a method for extracting and dynamically monitoring glacial lake based on the normalized polarization entropy ratio of dual-polarization SAR images. In order to verify the feasibility of the method, the Sentinel-1 dual-polarization image sequence of ESA was selected to carry out the dynamic extraction of glacial lakes and the analysis of long-term temporal variations on a time span of 4a for the typical experimental area located in the glacier basin of A'nyemaqen. The spatial and temporal changes of the glacial lake at the end of the A'nyemaqen glacier during 2019–2022 were successfully obtained through experiments, and then it was found that the area of the glacial lake near 4a was decreasing.

Keywords: Synthetic aperture radar (SAR); Glacial lake; A'nyemaqen glacier; Dual-polarization; Remote sensing classification

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