



地理学报(英文版) 2004年第14卷第3期

Remote sensing detection of glacier changes in Tianshan Mountains for the past 40 years

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Both marginal fluctuation and areal change were used to detect the accurate dynamics of glacier change in the study area using Landsat MSS, ETM, SPOT HRV and topographic maps based on GIS. From 1963 to 1977, four of eight glaciers advanced, two of them retreated and another two kept stable, the glacier advanced generally. From 1977 to 1986, four of eight glaciers retreated and the others kept stable, but the retreated glaciers were those which advanced from 1963 to 1977. From 1986 to 2000, seven of eight glaciers retreated and only one glacier kept stable, the retreating velocity was 10-15 m/a. Glacier recession in this period became very fast and universal. From 1963 to 2000, the area of glaciers decreased from 5479.0 ha to 4795.4 ha, up to 12.5%. It is alarming that most of glacier retreats happened from 1986 to 2000. This was very consistent with change process of summer mean temperature in this region and global warming beginning in the 1980s.

Paper (PDF)

关键词: Tianshan Mountains; glacier; remote sensing; glacier retreat; global warming doi: 10.1360/gs/040305