A Big Earth Data Platform for Three Poles

**Glacier coverage data on the Tibetan Plateau in 1970s (TPG1976, Version 1.0)**

1、Description

The Tibetan Plateau Glacial Data -TPG1976 is a glacial coverage data on the Tibetan Plateau in the 1970s. It was generated by manual interpretation from Landsat MSS multispectral image data. The temporal coverage was mainly from 1972 to 1979 by 60 m spatial resolution. It involved 205 scenes of Landsat MSS/TM. There were 189 scenes（92% coverage on TP）in 1972-79，including 116 scenes in 1976/77 (61% of all the collected satellite data).As high quality of MSS data is not accessible due to cloud and snow effects in the South-east Tibetan Plateau, earlier Landsat TM data was collected for usage, including 14 scenes of 1980s（1981,1986-89,which covers 6.5% of TP） and 2 scenes in 1994（by 1.5% coverage on TP）.Among all satellite data，77% was collected in winter with the minimum effects of cloud and seasonal snow. The most frequent year in this period was defined as the reference year for the mosaic image: i.e. 1976. Glacier outlines were digitized on-screen manually from the 1976 image mosaic, relying on false-colour image composites (MSS: red, green and blue (RGB) represented by bands 321; TM: RGB by bands 543), which allowed us to distinguish ice/snow from cloud. Debris-free ice was distinguished from the debris and debris-covered ice by its higher reflectance. Debris-covered ice was not delineated in this data. The delineated glacier outlines were compared with band-ratio results, and validated by overlapping them onto Google Earth imagery, SRTM DEM, topographic maps and corresponding satellite images. For areas with mountain shadows and snow cover, they were verified by different methods using data from different seasons. For glaciers in deep shadow, Google EarthTM imagery from different dates was used as the reference for manual delineation. Steep slopes or headwalls were also excluded in the TPG1976. Areas that appeared in any of these sources to have the characteristics of exposed ground/basement/bed rock were manually delineated as non-glacier, and were also cross-checked with CGI-1 and CGI-2. Steep hanging glaciers were included in TPG1976 if they were identifiable on images in all three epochs (i.e. TPG1976, TPG2001, and TPG2013). The accuracy of manual digitization was controlled within one half-pixel. All glacier areas were calculated on the WGS84 spheroid in an Albers equal-area map projection centred at (95°E, 30°N) with standard parallels at 15°N and 65°N. Our results showed that the relative deviation of manual interpretation was less than 6.4% due to the 60 m spatial resolution images.

2、Keywords

Theme：Glaciers,Glacier coverage,Remote Sensing Technology,Optical remote sensing,Glacier(Ice Sheet)
Discipline：Remote Sensing Technology,Cryosphere
Places：Tibetan Plateau
Time：1972-1979, 1980-1994

3、Data details

1.Scale：None

2.Projection：

3.Filesize：86500.0MB

4.Data format：Shapefile、tif

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：40.0 | - |
| west：72.0 | - | east：105.0 |
| - | south：26.0 | - |

5、Time frame:1972-01-15 16:00:00+00:00--1994-12-25 03:00:00+00:00

6、Reference method

References to data:

YE Qinghua. Glacier coverage data on the Tibetan Plateau in 1970s (TPG1976, Version 1.0). A Big Earth Data Platform for Three Poles, doi:10.11888/GlaciolGeocryo.tpe.00000047.file2018

References to articles:

Ye, Q.H., Zong, J.B., Tian, L.D., Cogley, J.G., Song, C.Q., & Guo, W.Q. (2017). Glacier changes on the Tibetan Plateau derived from Landsat imagery: mid-1970s-2000-2013. Journal of Glaciology, 63(238), 273-287. doi:10.1017/jog.2016.137

7、Supporting project information

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8、Data resource provider

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