A Big Earth Data Platform for Three Poles

**An improved Terra–Aqua MODIS snow cover and Randolph Glacier Inventory 6.0 combined product (MOYDGL06\*) for high-mountain Asia between 2002 and 2018**

1、Description

Snow is a significant component of the ecosystem and water resources in high-mountain Asia (HMA). Therefore, accurate, continuous, and long-term snow monitoring is indispensable for the water resources management and economic development. The present study improves the Moderate Resolution Imaging Spectroradiometer (MODIS) onboard Terra and Aqua satellites 8 d (“d” denotes “day”) composite snow cover Collection 6 (C6) products, named MOD10A2.006 (Terra) and MYD10A2.006 (Aqua), for HMA with a multistep approach. The primary purpose of this study was to reduce uncertainty in the Terra–Aqua MODIS snow cover products and generate a combined snow cover product. For reducing underestimation mainly caused by cloud cover, we used seasonal, temporal, and spatial filters. For reducing overestimation caused by MODIS sensors, we combined Terra and Aqua MODIS snow cover products, considering snow only if a pixel represents snow in both the products; otherwise it is classified as no snow, unlike some previous studies which consider snow if any of the Terra or Aqua product identifies snow. Our methodology generates a new product which removes a significant amount of uncertainty in Terra and Aqua MODIS 8 d composite C6 products comprising 46 % overestimation and 3.66 % underestimation, mainly caused by sensor limitations and cloud cover, respectively. The results were validated using Landsat 8 data, both for winter and summer at 20 well-distributed sites in the study area. Our validated adopted methodology improved accuracy by 10 % on average, compared to Landsat data. The final product covers the period from 2002 to 2018, comprising a combination of snow and glaciers created by merging Randolph Glacier Inventory version 6.0 (RGI 6.0) separated as debris-covered and debris-free with the final snow product MOYDGL06\*. We have processed approximately 746 images of both Terra and Aqua MODIS snow containing approximately 100 000 satellite individual images. Furthermore, this product can serve as a valuable input dataset for hydrological and glaciological modelling to assess the melt contribution of snow-covered areas. The data, which can be used in various climatological and water-related studies, are available for end users at https://doi.org/10.1594/PANGAEA.901821 (Muhammad and Thapa, 2019).

2、Keywords

Theme：MODIS,Snow,Glacier coverage,Cryosphere remote sensing products,Surface Freeze-thaw Cycle/state Remote Sensing,glacier inventory,Randolph Glacier Inventory（RGI)6.0,Snowpack,Glacier(Ice Sheet),MOD10A12 MYD10A2,Snow cover
Discipline：Cryosphere
Places：High Mountain Asia
Time：2002-2018

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：3713.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：49.19 | - |
| west：58.22 | - | east：122.48 |
| - | south：24.32 | - |

5、Time frame:2002-10-31 16:00:00+00:00--2019-01-15 16:00:00+00:00

6、Reference method

References to data:

SHER Muhammad. An improved Terra–Aqua MODIS snow cover and Randolph Glacier Inventory 6.0 combined product (MOYDGL06\*) for high-mountain Asia between 2002 and 2018. A Big Earth Data Platform for Three Poles, doi:10.1594/PANGAEA.9018212020

References to articles:

7、Supporting project information

8、Data resource provider

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