A Big Earth Data Platform for Three Poles

**A digital elevation model of Antarctica derived from ICESat-2 (May 2019)**

1、Description

Antarctic digital elevation model (DEM) is essential for human fieldwork, ice topography monitoring and ice mass change estimation. A new-generation satellite laser altimeter ICESat-2 is used to generate a new and specific time-stamped Antarctic DEM for both ice sheet and ice shelves. Approximately 4.69 × 109 ICESat-2 measurement points from November 2019 to November 2020 are used to estimate surface elevations at resolutions of 500 m and 1 km based on a spatiotemporal fitting method, which posts this DEM at a modal resolution of 500 m. About 74% of Antarctica are observed and the remaining observation gaps are interpolated using the ordinary kriging method. National Aeronautics and Space Administration Operation IceBridge (OIB) airborne data are used to evaluate the generated Antarctic DEM (hereafter call it ICESat-2 DEM). Overall, a median bias of -0.19 m and root-mean-square deviation of 10.83 m are found from appropriately 5.2 × 106 spatiotemporal matched measurement points. The accuracy and uncertainty of ICESat-2 DEM vary in relation to the surface slope and roughness, more reliable estimates can be found in the flat ice sheet interior. ICESat-2 DEM is comparable to previous DEMs derived from satellite altimeters, stereo-photogrammetry and interferometry. The high accuracy and a specific time stamp make ICESat-2 DEM an essential addition to the existing Antarctic DEM groups and can be further used for other scientific applications.

2、Keywords

Theme：Glacier(Ice Sheet)  
Discipline：Cryosphere  
Places：Antarctic  
Time：May 2019

3、Data details

1.Scale：None

2.Projection：South\_Pole\_Stereographic

3.Filesize：268.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：-60.0 | - |
| west：-180.0 | - | east：180.0 |
| - | south：-90.0 | - |

5、Time frame:None--None

6、Reference method

References to data:

SHEN Xiaoyi, FAN Yubin, KE Changqing. A digital elevation model of Antarctica derived from ICESat-2 (May 2019). A Big Earth Data Platform for Three Poles, doi:10.11888/Geogra.tpdc.2714482021

References to articles:

7、Supporting project information

8、Data resource provider

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