A Big Earth Data Platform for Three Poles

**Antarctic ice sheet surface elevation data (2003-2009)**

1、Description

The Antarctic ice sheet elevation data were generated from radar altimeter data (Envisat RA-2) and lidar data (ICESat/GLAS). To improve the accuracy of the ICESat/GLAS data, five different quality control indicators were used to process the GLAS data, filtering out 8.36% unqualified data. These five quality control indicators were used to eliminate satellite location error, atmospheric forward scattering, saturation and cloud effects. At the same time, dry and wet tropospheric, correction, solid tide and extreme tide corrections were performed on the Envisat RA-2 data. For the two different elevation data, an elevation relative correction method based on the geometric intersection of Envisat RA-2 and GLAS data spot footprints was proposed, which was used to analyze the point pairs of GLAS footprints and Envisat RA-2 data center points, establish the correlation between the height difference of these intersection points (GLAS-RA-2) and the roughness of the terrain relief, and perform the relative correction of the Envisat RA-2 data to the point pairs with stable correlation. By analyzing the altimetry density in different areas of the Antarctic ice sheet, the final DEM resolution was determined to be 1000 meters. Considering the differences between the Prydz Bay and the inland regions of the Antarctic, the Antarctic ice sheet was divided into 16 sections. The best interpolation model and parameters were determined by semivariogram analysis, and the Antarctic ice sheet elevation data with a resolution of 1000 meters were generated by the Kriging interpolation method. The new Antarctic DEM was verified by two kinds of airborne lidar data and GPS data measured by multiple Antarctic expeditions of China. The results showed that the differences between the new DEM and the measured data ranged from 3.21 to 27.84 meters, and the error distribution was closely related to the slope.

2、Keywords

Theme：Digital elevation model,Topography,Cryosphere remote sensing products,Surface Freeze-thaw Cycle/state Remote Sensing,Glacier(Ice Sheet)  
Discipline：Terrestrial Surface,Cryosphere  
Places：Antarctic  
Time：

3、Data details

1.Scale：None

2.Projection：

3.Filesize：308.0MB

4.Data format：.tif

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：-60.0 | - |
| west：None | - | east：360.0 |
| - | south：-90.0 | - |

5、Time frame:2003-01-07 16:00:00+00:00--2010-01-06 16:00:00+00:00

6、Reference method

References to data:

HUANG Huabin. Antarctic ice sheet surface elevation data (2003-2009). A Big Earth Data Platform for Three Poles, doi:10.11888/Glacio.tpdc.2708912018

References to articles:

黄华兵, 程晓, 宫鹏, & CLINTON Nick. (2014). 基于星载激光雷达和雷达高度计数据的南极冰盖表面高程制图. 遥感学报, 18(1), 117-125.

7、Supporting project information

CASEarth:Big Earth Data for Three Poles（grant No. XDA19070000）

8、Data resource provider

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