A Big Earth Data Platform for Three Poles

**Annual Iceberg Calving Dataset of the Antarctic Ice Shelves (2005-2020)**

1、Description

Iceberg calving, one of the key process of Antarctic mass balance, has been regarded as an important variable in fine monitoring the changes of ice shelves. The authors used multi-source remote sensing data near early August of each year from 2005 to 2020, including ENVISAT ASAR (WSM) images from 2005 to 2011, Terra/Aqua MODIS 7-2-1 band composite images from 2012 to 2014, Landsat-8 OLI 4-3-2 band composite images from 2013 to 2020, and Sentinel-1 SAR (EW) images from 2015 to 2020, to generate annual circum-Antarctic image mosaics after pre-processing. Next, combining MEaSUREs ice velocity dataset, grounding line, ice thickness dataset (Bedmap 2 and Bedmachine), spatial calculation and map digitization techniques were applied to extract all annual calving events larger than 1 km² that occurred on the Antarctic ice shelves from August 2005 to August 2020. Also, their area, thickness, mass and calving recurrence cycle were calculated to derive the annual iceberg calving dataset of the Antarctic ice shelves (2005-2020). This dataset contains the distribution of 15-year annual calving events, along with the attributes of each individual calving event including calving year, length, area, average thickness, mass, and recurrence interval. This dataset can directly reflect the magnitude characteristics and distribution of Antarctic iceberg calving in different years, which fills the gap of fine monitoring dataset of iceberg calving and provides fundamental data for subsequent research on calving mechanism and mass balance of Antarctic ice shelf-ice sheet system.

2、Keywords

Theme：Cryosphere remote sensing products,Surface Freeze-thaw Cycle/state Remote Sensing,Ice shelf,Glacier(Ice Sheet),Satelite images,Terrestrial Surface Remote Sensing,Icebergs
Discipline：Terrestrial Surface,Cryosphere
Places：Antarctic ice shelf
Time：2005-2020

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：3.97MB

4.Data format：None

4、Space scope

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

5、Time frame:2005-07-31 16:00:00+00:00--2020-07-30 16:00:00+00:00

6、Reference method

References to data:

CHENG Xiao, CHEN Zhuoqi, QI Mengzhen, HUI Fengming. Annual Iceberg Calving Dataset of the Antarctic Ice Shelves (2005-2020). A Big Earth Data Platform for Three Poles, doi:10.11888/Glacio.tpdc.2712502021

References to articles:

Qi, M., Liu, Y., Liu, J., Cheng, X., Feng, Q., Shen, Q., and Yu, Z. (2021). A 15-yr Circum-Antarctic Iceberg Calving Dataset Derived from Continuous Satellite Observations, Earth Syst. Sci. Data Discuss. [preprint], https://doi.org/10.5194/essd-2020-340, in review.

Qi, M., Liu, Y., Lin, Y., Hui, F., Li, T., Cheng, X. (2020). Efficient Location and Extraction of the Iceberg Calved Areas of the Antarctic Ice Shelves. Remote Sensing 2020, 12, doi:10.3390/rs12162658.

7、Supporting project information

8、Data resource provider

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