A Big Earth Data Platform for Three Poles

**Dataset of microwave brightness temperature and the freeze-thaw process for medium-to-large lakes in the High Asia Region (2002-2016)**

1、Description

The High Asia region is an area sensitive to global changes in mid-latitude regions and is a hotspot for research. The lakes in the territory are scattered, and the lake freeze-thaw process is one of the key factors sensitive to global change. Due to the large difference in the dielectric constant between ice and water, satellite-borne passive microwave remote sensing is weather insensitive and has a high revisiting rate; thus, it can achieve rapid monitoring of the freeze-thaw state of lakes. According to the area ratio of the lake and the land surface in the sub-pixels of passive microwave radiometer data, this data set represents the lake brightness temperature information of the pixel (sub-pixel level) by applying the hybrid pixel decomposition method in order to monitor the lake freeze-thaw process in the High Asia region. Thus, by adopting a variety of passive microwave data, time series of lake brightness temperature and freeze-thaw status were obtained for a total of 51 medium to large lakes from 2002 to 2016 in the High Asia region. Using cloudless MODIS optical products as validation data, three lakes of different sizes in different regions of High Asia, i.e., Hoh Xil Lake, Dagze Co Lake, and Kusai Lake, were selected for freeze-thaw detection validation. The results indicated that the lake freeze-thaw parameters obtained by microwave and optical remote sensing were highly consistent, and the correlation coefficients reached 0.968 and 0.987. This data set contained the time series brightness temperature of lakes and the freeze-thaw parameters of lake ice, which could be used to further invert the characteristic parameters of lakes and enhance the understanding of lake ice freezing and thawing in the High Asia region. This database will be useful in the assessment of climatic and environmental changes in the High Asia region and in global climatic change response models. The data set consists of two parts: the passive microwave remote sensing brightness temperature data set of 51 lakes in the High Asia region from 2002 to 2016, with an observation interval of 1 to 2 days, and the lake ice freeze-thaw data set obtained by estimation of the lake brightness temperature. The files are the lake brightness temperature data via the nearest neighbour method and pixel decomposition in the form of a .zip file (12 MB) and the lake freeze-thaw data set for 51 lakes in the High Asia region from 2002 to 2016 in the form of an .xls file (0.1 MB).

2、Keywords

Theme：Lake ice,Microwave remote sensing,Lake ice,Surface Freeze-thaw Cycle/state Remote Sensing,Freeze thawing,Frozen Ground
Discipline：Cryosphere
Places：High Asia
Time：2002-2016

3、Data details

1.Scale：250000

2.Projection：

3.Filesize：12.1MB

4.Data format：EXCEL

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：45.96 | - |
| west：61.95 | - | east：105.48 |
| - | south：24.66 | - |

5、Time frame:2002-07-13 00:00:00+00:00--2017-01-09 00:00:00+00:00

6、Reference method

References to data:

QIU Yubao. Dataset of microwave brightness temperature and the freeze-thaw process for medium-to-large lakes in the High Asia Region (2002-2016). A Big Earth Data Platform for Three Poles, doi:10.11922/sciencedb.3742018

References to articles:

邱玉宝, 郭华东, 阮永俭, 付心如, 石利娟, 田邦森. (2017). 2002～2016年高亚洲中大型湖泊微波亮温和冻融数据集. Science Data Bank. http://www.dx.doi.org/10.11922/sciencedb.374

7、Supporting project information

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8、Data resource provider

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