A Big Earth Data Platform for Three Poles

**Snow depth product over Arctic sea ice based on analysis reconstruction from 2012 to 2020**

1、Description

Due to its high surface albedo and low thermal conductivity, snowpack on sea ice can effectively adjust the change of sea ice (growth and melting) and control energy budgets. It is an important parameter for sea ice thickness estimation. This product provides the daily snow depth on Arctic sea ice from 2012 to 2020 (September to April). Based on the original reanalysis reconstruction model (NASA Eulerian Snow on Sea Ice Model), we add a melting process, and then combine with the particle filter method to construct the snow depth estimation model. The ERA5 data (snowfall, 2-m air temperature and wind speed data) provided by the ECMWF, sea ice drift data provided by the OSI SAF and sea ice concentration data provided by the NSIDC are used to force the reanalysis reconstruction model to obtain the simulated snow depth, and then the satellite-derived snow depths are assimilated into the model to obtain the cold-season snow depth on Arctic sea ice (October to April). Since there is no remote sensing data used for assimilation in September, the linear regression analysis is used to construct the relationship between the simulated snow depth and the assimilated snow depth to obtain the final snow depth data in September. Finally, the final snow depth on Arctic sea ice from 2012 to 2020 (September-April) is generated at a 50-km spatial resolution. This product can effectively integrate the advantages of satellite data and simulation data, and is in good agreement with three OIB data (i.e., the NSIDC OIB quick look product, NSIDC OIB L4 product and OIB product provided by the NOAA), with root mean square errors (RMSE) of 5.80 cm, 4.61 cm and 6.50 cm, respectively. This data set can provide accurate input parameters for the estimation of sea ice thickness and volume, help to analyze the Arctic mass balance and energy balance, and promote the future development of sea ice models.

2、Keywords

Theme：Snow on sea ice,Sea Ice
Discipline：Cryosphere
Places：
Time：2012-2020

3、Data details

1.Scale：None

2.Projection：

3.Filesize：32.6MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：90.0 | - |
| west：-180.0 | - | east：180.0 |
| - | south：30.98 | - |

5、Time frame:None--None

6、Reference method

References to data:

LI Haili, KE Changqing. Snow depth product over Arctic sea ice based on analysis reconstruction from 2012 to 2020. A Big Earth Data Platform for Three Poles, doi:10.11888/Cryos.tpdc.2718662021

References to articles:

7、Supporting project information

8、Data resource provider

name: KE Changqing
unit:
email: kecq@nju.edu.cn

name: LI Haili
unit: Nanjing university
email: 573780168@qq.com