A Big Earth Data Platform for Three Poles

**Long-term (1982-2018) global gross primary production dataset based on NIRv**

1、Description

Vegetation photosynthesis is a key component of carbon cycle in terrestrial ecosystem. Simulating photosynthesis activities on different spatial and temporal scales is helpful to solve the problem of land carbon budget, and it is also an important way to accurately predict the direction of future climate change and an important prerequisite for scientific understanding of the supporting capacity of terrestrial ecosystem for sustainable development of human society. At present, although a variety of algorithms and products for estimating the total primary productivity (GPP) of ecosystems have been relatively mature, there are still great differences and uncertainties in the global GPP products of long time series, especially the trend of their temporal variation. Sunlight induced chlorophyll fluorescence (SIF) remote sensing is a new type of remote sensing technology developed rapidly in recent years. The close relationship between SIF and photosynthetic process makes it an effective probe to indicate the changes of vegetation photosynthesis and a powerful means to monitor GPP. A new vegetation index (Nirv) based on remote sensing data, namely the product of normalized vegetation index (NDVI) and near-infrared reflectance, is highly related to remote sensing SIF products; based on mechanism derivation, model simulation and analysis of remote sensing data, Nirv can be used as an alternative product of SIF to estimate global GPP.  
Therefore, on the basis of analyzing the feasibility of Nirv as SIF and GPP probe, this data set generates the global high-resolution long-time series GP data from 1982 to 2018 based on the AVHRR data of remote sensing and hundreds of flux stations around the world, and analyzes the temporal and spatial variation trend of global GPP. The resolution is month, 0.05 degree, and the data unit is gcm-2 The annual average global GPP is about 128.3 ± 4.0 PG Cyr − 1, and the root mean square error (RMSE) of the data is 1.95 gcm-2 D-1. The data set can be used to study global climate change and carbon cycle.

2、Keywords

Theme：Galactic System  
Discipline：Solar-Terrestrial Physics and Astronomy  
Places：Global scale  
Time：Long-term

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：2600.0MB

4.Data format：None

4、Space scope

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

5、Time frame:1982-03-13 08:00:00+00:00--2019-02-25 08:00:00+00:00

6、Reference method

References to data:

WANG Songhan, ZHANG Yongguang. Long-term (1982-2018) global gross primary production dataset based on NIRv. A Big Earth Data Platform for Three Poles, doi:10.6084/m9.figshare.12981977.v22020

References to articles:

Wang, S., Zhang, Y., Ju, W., Qiu, B. & Zhang, Z. (2021). Tracking the seasonal and inter-annual variations of global gross primary production during last four decades using satellite near-infrared reflectance data, Science of The Total Environment, 755, 142569, https://doi.org/10.1016/j.scitotenv.2020.142569.

7、Supporting project information

National Key Research and Development Program of China  
International Cooperation and Exchange Programme between NSFC and DFG  
National Key Research and Development Program of China

8、Data resource provider

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