A Big Earth Data Platform for Three Poles

**Long-time built-up land expansion in Hebei, Henan, Shandong, Anhui and Jiangsu, Beijing and Tianjin from 1990 to 2019**

1、Description

1) Significance: construction land is one of the highest performance of human activities. The consumption of natural resources and the change of ecological environment can be closely linked with the development of construction land. This data reflects the evolution of high-precision construction land with 30 m spatial resolution from 1990 to 2019 in 7 provinces/municipalities directly under the central government of China, which are also important areas for rapid urbanization.  
2) Data sources: Landsat series satellite data; China regional surface meteorological element driven data set (1979-2018)  
3) Processing method: supervised classification method is adopted, random forest algorithm and Fourier transform are used to process characteristic bands, and control points are classified based on visual interpretation.  
 3-1) Obtaining spectral features: First, screen out Landsat images with transport volume <20%, and superimpose these images in units of 3 years, and then take the median of each superimposed pixel as the target pixel for pixel stitching. Obtain cloud-free images of the entire study area. This method can also better remove the banding influence of Landsat7 data.  
 3-2) Acquisition of time features: each pixel that has been superimposed for 3 years is screened for cloud cover, and discrete Fourier transform is performed following the minimum mean square error fitting principle to obtain the time latitude of each pixel. "Crest", "Trough" and "Phase". This method can better eliminate the influence of “bare land” on the extraction of construction land, because bare land may be covered by vegetation in spring and summer, and its time characteristics are quite different from construction land.  
 3-3) Extraction of meteorological and terrain features: The meteorological features are calculated from the China Regional Ground Meteorological Elements Driven Data Set (1979-2018): the data set is superimposed at the same time interval as Landsat, and each image is obtained The average value of yuan is used as the meteorological feature (due to the lack of meteorological data for 2019, the meteorological feature of the last period only calculates the average value of 2017 and 2018). Topographic features (elevation, slope) use SRTM-30m data.  
The detailed method and code can be seen as follows: https://github.com/wangjinzhulala/North\_ China\_ Plain\_ GEE\_ Organized  
4) Data quality: the overall accuracy of all years is better than 94%.  
5) Application prospects: Simulation of regional urban expansion; estimation of environmental impact of urbanization; quantification of food security and sustainable development.

2、Keywords

Theme：Spatial pattern of cities,Terrestrial Surface Remote Sensing  
Discipline：Terrestrial Surface  
Places：Henan; Hebei; Shandong; Anhui; Jiangsu  
Time：1990-2019

3、Data details

1.Scale：None

2.Projection：WGS84

3.Filesize：87.6MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：42.61 | - |
| west：110.34 | - | east：122.71 |
| - | south：29.39 | - |

5、Time frame:1989-12-31 16:00:00+00:00--2019-12-30 16:00:00+00:00

6、Reference method

References to data:

WANG Jinzhu. Long-time built-up land expansion in Hebei, Henan, Shandong, Anhui and Jiangsu, Beijing and Tianjin from 1990 to 2019. A Big Earth Data Platform for Three Poles, doi:10.11888/Socioeco.tpdc.2711772021

References to articles:

Wang, J., Hadjikakou, M., Bryan, B. Mapping Built-Up Land with High Accuracy Using Fourier Transformation and Temporal Correction. Preprints 2020, 2020120105 (doi: 10.20944/preprints202012.0105.v1).

7、Supporting project information

8、Data resource provider

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