A Big Earth Data Platform for Three Poles

**A Prolonged Artificial Nighttime-light Dataset of China (1984-2020)**

1、Description

Nighttime light remote sensing has been an increasingly important proxy for human activities including socioeconomics and energy consumption. Defense Meteorological Satellite Program-Operational Linescan System from 1992 to 2013 and Suomi National Polar-Orbiting Partnership-Visible Infrared Imaging Radiometer Suite since 2012 are the most widely used datasets. Despite urgent needs for long-term products and pilot explorations in synthesizing them, the publicly available long-term products are limited. We propose a Night-Time Light convolutional Long Short-Term Memory (NTLSTM) network, and apply the network to produce annual Prolonged Artificial Nighttime-light DAtaset (PANDA) in China from 1984 to 2020. Model assessments between modelled and original images show that on average the Root Mean Squared-Error (RMSE) reaches 0.73, the coefficient of determination (R2) reaches 0.95, and the linear slope is 0.99 at pixel level, indicating a high confidential level of the data quality of the generated product. In urban areas, the modelled results can well capture temporal trends in newly built-up areas but slightly underestimate the intensity within old urban cores. Socioeconomic indicators (built-up areas, Gross Domestic Product, population) correlates better with the PANDA than with previous products in the literature, indicating its better potential in finding different controls of nighttime-light variances in different phases. Besides, the PANDA delineates different urban expansion types, outperforms other products in representing road networks, and provides potential nighttime-light sceneries in early years. PANDA provides the opportunity to better bridge the cooperation between human activity observations and socioeconomic or environmental fields

2、Keywords

Theme：Night light,Human-nature Remote Sensing,DMSP-OLS
Discipline：Human-nature Relationship
Places：urban, China
Time：1984-2020

3、Data details

1.Scale：None

2.Projection：

3.Filesize：400.0MB

4.Data format：None

4、Space scope

|  |  |  |
| --- | --- | --- |
| - | north：53.33 | - |
| west：73.33 | - | east：135.05 |
| - | south：3.51 | - |

5、Time frame:1983-12-31 16:00:00+00:00--2020-12-30 16:00:00+00:00

6、Reference method

References to data:

GONG Peng, REN Zhehao, ZHANG Lixian, FU Haohuan, CHEN Bin, XU Bing. A Prolonged Artificial Nighttime-light Dataset of China (1984-2020). A Big Earth Data Platform for Three Poles, doi:10.11888/Socioeco.tpdc.2712022021

References to articles:

7、Supporting project information

8、Data resource provider

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