# 1 km grid GDP data of China (2005, 2010)

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**Abstract:** The GDP data in China are available in the format of statistical tables with the spatial scale of administrative district in GIS. Sometimes they are not instable, imprecise and not unified with most geographic datasets. GDP in pixels instead of administrative polygons will facilitate the integration and comprehensive analysis between GDP and remote sensing products, such as land use and land cover changes. GDP datasets of China are composed of primary industry GDP, secondary industry GDP, and tertiary industry GDP. The correlative relationships between the land use and three industries were analyzed, and the spatial correlation model was implemented. The model was used to calculate the statistical GDP of every county for each pixel. The 1 km grid GDP datasets of China in 2005 and 2010 were derived. Forty counties including township GDP data were selected for precision verification. The results showed that the errors of the spatial GDP data in these counties were between 6% and 17%.

**Keywords:** China; GDP; grid; spatial data; 2005; 2010
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## 1 Introduction

The 1 km grid GDP dataset of China (2005, 2010) was derived based on the comprehensive analysis and data integration with land use data which were extracted from satellite imageries with the resolution of 30 meters and the statistical GDP data of each county.

## 2 The metadata of 1 km grid GDP dataset of China (2005, 2010)

The descriptions of the 1 km grid GDP dataset of China (2005, 2010) (GDPGrid_China for short) dataset are recorded. These information include the dataset full name, dataset short name, corresponding author, authors, geographical region of the dataset content, year of the dataset, number of the dataset tiles, dataset spatial and temporal resolution, dataset format and size, data publisher, data sharing platform and contact information, technical editors, foundation and the data sharing policy. Table 1 below summarizes the main metadata elements of the GDPGrid_China dataset.

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**Table 1 Summary of the GDPGrid_China (2005, 2010) metadata**

| | |
|---|---|
| Dataset full name | 1 km grid GDP dataset of China (2005, 2010) |
| Dataset short name | GDPGrid_China |
| Corresponding author: | HUANG Yaohuan (huangyh@lreis.ac.cn) |
| Authors | HUANG Yaohuan, Institute of Geographic Sciences and Natural Resources Research, CAS, huangyh@lreis.ac.cn<br>JIANG Dong, Institute of Geographic Sciences and Natural Resources Research, CAS, jiangd@igsnrr.ac.cn<br>FU Jingying, Institute of Geographic Sciences and Natural Resources Research, CAS , fujy@lreis.ac.cn |
| Geographical region | The region extends from 3°51'N to 53°33'N and 73°33'E to 153°5'E covering mainland of China. |
| Year of the dataset | 2005, 2010 |
| Spatial resolution | 1 km |
| Data format | ARCGIS GRID Dataset size 46.8M |
| Data publisher | Global Change Research Data Publishing and Repository, DOI:10.3974/ |
| Data access and services platform | Global Change Research Data Publishing and Repository, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, http://www.geodoi.ac.cn<br>National Data Sharing Infrastructure of Earth System Sciences of China, http://www.geodata.cn |
| Academic editors | LIU Chuang, SHI Ruixiang, ZHOU Xiang, HE Shujin |
| Data sharing policy | The authors of the dataset agree to publish the data here according to the Article I of Data Sharing Policy of the Global Change Data Publishing and Repository, which states that the dataset can be used freely for research, education, and decision making; any users for commercial uses should get formal permission from IGSNRR/CAS. |

**Table 2 The relationships between GDP and land use type**

| Land Use | Primary Industry | Secondary Industry | Tertiary Industry |
|---|---|---|---|
| Cultivated land, forest land, grassland, water area | 1 | 0 | 0 |
| Urban, rural an industrial land | 0 | 1 | 1 |

Note: "1" means strong relationship, and "0" means irrelevant or very weak relationship.

## 3 Method

The key point to produce the gridded GDP dataset is to establish the correlation relationships between the GDP data in county level and land use types in GIS (see Table 2). After analysis of land use patterns, it is shown that the land use patterns were affected by human activities and primary industry GDP, secondary industry GDP and tertiary industry GDP and established the spatial models respectively. Integrated with land use data and administrative boundary data in county level for 1 x 1 km pixel, the dataset of statistical GDP of each county represented the detailed spatial distribution of GDP in the mainland of China. The dataset format is ARCGIS grid. The specific flowchart of gridded GDP dataset product was represented in Figure 1.

First, the study area was divided into a number of regions based on the relative natural resources, population, and economics. Second, a certain number of representative counties in each zone were selected as the samples in modeling. The model could be used to analyze the statistical GDP data in each zone based on the land use types. The detail methodology was published[1-4]. The statistical GDP come from references [5-6] and the boundary data come from reference [7].

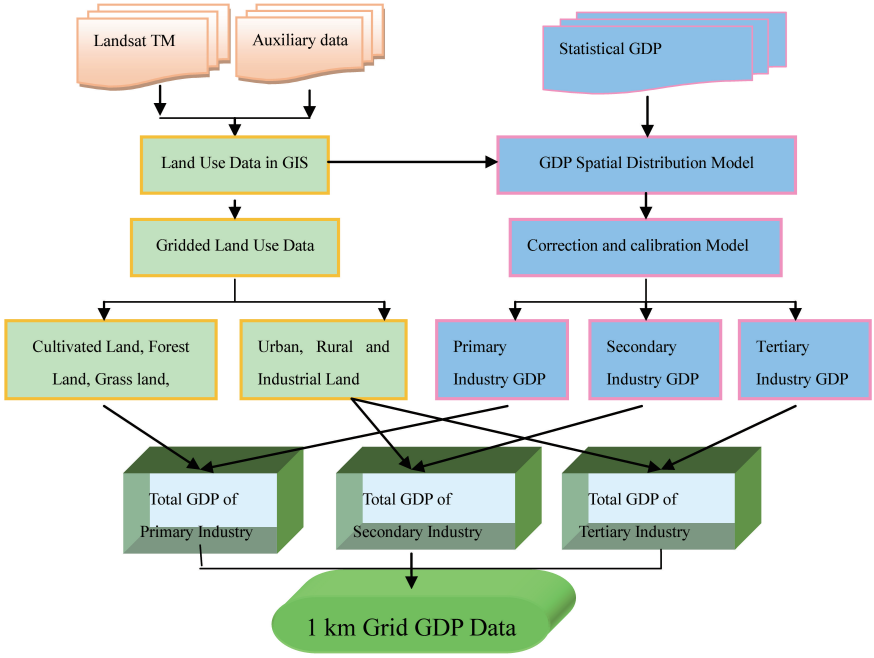


Figure 1 Procedure of 1 km grid GDP data development

## 4 Dataset product

The total size of the1 km Grid GDP Dataset of China (2005, 2010) was 48.1 MB (see Figures 2 and 3). The data format is ARCGIS GRID and the unit is RMB 10,000 (Chinese Yuan).

## 5 Dataset quality control and validation

To verify the accuracy of the 1 km Grid GDP Dataset of China (2005, 2010), forty counties were selected as sample to evaluate the difference between the actual data and the developed data. The forty counties selected are: Dongcheng District (Beijing), Chaoyang District (Beijing), Fangshan District (Beijing), Daxing County (Beijing), Yanqing County (Beijing); Huangpu District (Shanhai), Xuhui District (Shanhai), Zhabei District (Shanhai), Songjiang District (Shanhai), Chongming County (Shanhai); Nanguan,

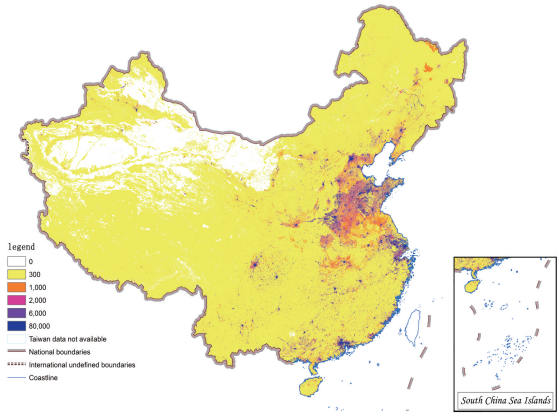


Figure 2 The 1 km grid GDP dataset of China (2005)

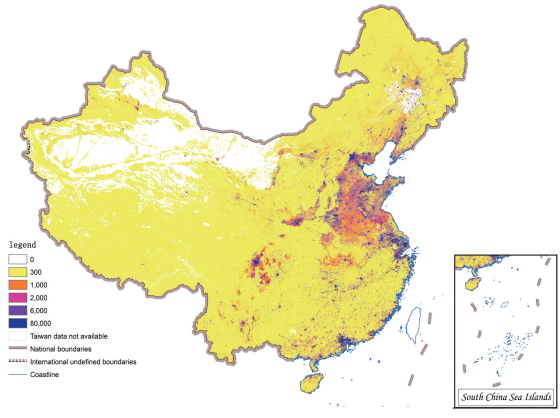


Figure 3 The 1 km grid GDP dataset of China (2010)

Yongji, Lishu, Dongliao, Tonghua, Fusong, Tongyu, Changling, Wangqing; Zhongmeng (Henan Province), Tongxu (Henan Province), Ruyang (Henan Province), Shanxian (Henan Province), Neihuang (Henan Province), Qixian (Henan Province), Fengqiou (Henan Province), Wenxian (Henan Province), Taiqian (Henan Province); Urumqi (Xinjiang), Dushanzi (Xinjiang), Shanshan (Xinjiang), Yiwu (Xinjiang), Hutubi (Xinjiang), Wenquan (Xinjiang), Qiewei (Xinjiang), Wensu (Xinjiang); Wanzhou (Chongqing City), Qianjiang (Chongqing City), Beiling (Chongqing City), Yuzhong (Chongqing City), Daduko (Chongqing City), and Jiangbei (Chongqing City). The results showed that the errors of the spatial GDP data in these counties are between 6% and 17%.

## 6 Conclusion

The 1 km grid GDP data of China in 2005 and 2010 is the product from the data integration among land use GIS data in polygon, GDP data in table in county level and administrative boundary data in GIS in county level. The methodology using the model above to conduct the GDP in 1 km pixels is more efficient than that by integrating GDP data and administrative boundary data only. The key of this methodology is the land use GIS data in 1:100,000 scale in both years available. The 1 km Grid GDP Data of China in 2005 and 2010 were the product from the data integration with land use GIS data in polygon, GDP data in table in county level, and administrative boundary data in GIS in county level. The spatial model is more efficient than the one integrated with GDP data and administrative boundary data. The key of this methodology is the land use GIS data in 1:100,000 scale in both years available.

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