

Elevation Cluster Dataset Covering Henan Province, China

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Abstract: Elevation cluster dataset covering Henan province (Henan EVC for short), is a set of raster data on elevation classification at 90 m resolution in Henan province. It was produced based on SRTM DEM 90 m, Google Earth elevation data and boundary data of Henan province. The data processing procedure includes data mosaic, data mask, data projection transformation and data revision, etc. Elevation cluster dataset covering Henan province was divided into 8 levels, they are: <50 m, 50–100 m, 100–200 m, 200–500 m, 500–1,000 m, 1,000–1,500 m, 1,500–2,000 m, and >2,000 m. The result shows that the area of the plains, elevation less than 200 m, is 67.63% of the total; the hill is 16.89% with elevation of 200–500 m; while the area of mountains, over 500 m, is 15.48%. The dataset was archived in .tif and .xlsx formats with the data size of 2.13 MB (1.42 MB in compress).

Keywords: Henan province; elevation; SRTM DEM; cluster

1 Introduction

Elevation Cluster Dataset is a basic data for regional natural geographical features and layout of productive forces^[1]. Henan province in central China belongs to the typical temperate and subtropical, humid and semi-moist monsoonal climate with four clearly distinct seasons, and is composed of multi geomorphic types including plains, mountains, hills and basins. Elevation cluster dataset covering Henan province (Henan EVC) is a set of raster dataset on land elevation classification based on SRTM 90 m (shuttle radar topography mission 90 m), which was produced by National Aeronautics and Space Administration (NASA) and US National Imagery and Mapping Agency (NIMA), according to the terrain characteristic of Henan province.

2 Metadata of Dataset

The metadata of elevation cluster dataset covering Henan province^[2] is summarized in Table

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1. It includes the dataset full name, short name, authors, year of the dataset, temporal resolution, spatial resolution, data format, data size, data files, data publisher, and data sharing policy, etc.

Table 1 Summary of the Henan EVC metadata

Items	Description
Dataset full name	Elevation cluster dataset covering Henan province of China
Dataset short name	HenanEVC
Authors	Huang, Y. B. M-6370-2017, Henan University, hyb@henu.edu.cn Liao, S. B. M-6537-2017, Henan University/Institute of Disaster Prevention, liaosb@igsnr.ac.cn
Geographical region	110°21'E–116°39'E, 31°23'N–36°22'N
Year	2017
Spatial resolution	3 Arc Seconds
Data format	.tif, .xlsx Data size 2.13 MB (1.42 MB in compress)
Data files	The Elevation Cluster Dataset Covering the Henan province consists of two files: 1. Henan_EVC.zip, this is the land elevation classification raster data covering the Henan province. Data size is 2.12 MB 2. Sta_HenanEVC.xlsx, this is the statistical data of different elevation classification areas in Henan province. Data size is 12 KB
Foundation(s)	Ministry of Science and Technology of P. R. China (2017YFD0300400); Henan province of China (16A520081); Chinese Academy of Sciences (XDA05050000)
Data publisher	Global Change Research Data Publishing & Repository, http://www.geodoi.ac.cn
Address	No. 11A, Datun Road, Chaoyang District, Beijing 100101, China
Data sharing policy	Data from the Global Change Research Data Publishing & Repository includes metadata, datasets (data products), and publications (in this case, in the <i>Journal of Global Change Data & Discovery</i>). Data sharing policy includes: (1) Data are openly available and can be free downloaded via the Internet; (2) End users are encouraged to use Data subject to citation; (3) Users, who are by definition also value-added service providers, are welcome to redistribute Data subject to written permission from the GCdataPR Editorial Office and the issuance of a Data redistribution license; and (4) If Data are used to compile new datasets, the 'ten per cent principal' should be followed such that Data records utilized should not surpass 10% of the new dataset contents, while sources should be clearly noted in suitable places in the new dataset ^[3]

3 Methods

3.1 Study Area

Henan province is located between 110°21'E and 116°39'E, 31°23'N and 36°22'N. Its area is about 165,000 km² and lies in the central plains and in the transition zone between second and third geomorphologic ladder of China. Henan province is surrounded by Taihang Mountains on the north, Funiu Mountains on the west and Dabie Mountains on the south, and it is composed of basins in central and vast alluvial plain in middle east.

3.2 Data Acquisition and Processing

The SRTM data cover over 80% of the land surface of the earth between 60°S–60°N. For the United States, data was made available at 1-arc second resolution (approximately 30 m at the equator), but for the rest of the world the 1-arc second product was degraded to 3-arc seconds (approximately 90 m at the equator). SRTM has multiple revisions. V4.1 was released by the Consultative Group for International Agricultural Research (CGIAR) in September 2008. Compared with the previous versions, the areas of nodata in original SRTM data have been filled using new interpolation methods^[4]. The vertical error of the DEM's was reported

to be less than 16 m. SRTM 90 m are available in both ArcInfo ASCII and GeoTiff format for download as $5^{\circ} \times 5^{\circ}$ tiles, in geographic coordinate system—WGS84 datum^[5]. As a free global high resolution elevation data set, SRTM 90 m dataset has been widely applied in geological research.

Henan EVC was produced based on four SRTM DEM 90 m images while the Albers projection with map datum D Krasovsky 1940 was chosen as base projection. After a series of processing procedures, including data mosaic, data projection transformation and data mask with the boundary data of Henan province, Google Earth elevation model was used to correct the anomalies of image (Figure 1).

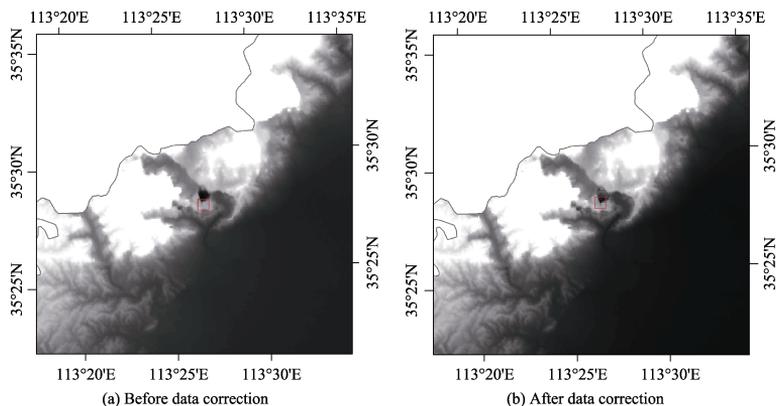


Figure 1 The data anomalies and corrections

3.3 Classifications of Elevation

According to the geomorphologic division standard of China, the existing research and the topography characteristics of Henan province^[6–8], elevation clusters were developed based on SRTM DEM 90 m (Table 2). Elevation less than 500 m, which is mainly composed of basins, hills and plains, was divided into four intervals. Elevation between 500 m and 2,000 m was divided by an interval of 500 m. Elevation more than 2,000 m, which is less than 0.01% of the total area of Henan province, was considered as a whole. Henan province was divided into eight land elevation classifications, the specific elevation classification interval standards are as follows: <50 m, 50–100 m, 100–200 m, 200–500 m, 500–1,000 m, 1,000–1,500 m, 1,500–2,000 m, and >2,000 m. Elevation classification in Henan province is presented in Figure 2.

4 Results

The HenanEVC dataset consist of two parts: 1) Henan_EVC, the elevation cluster data in .tif format with the data size of 2.12 MB; 2) Sta_HenanEVC.xlsx, the statistics file of elevation and area in Henan.

Henan EVC statistics result shows that its elevation decreases from west to east with stepped distribution characteristic. The plains and lowlands in central and eastern regions account for more than sixty percent of the total area which are suitable for agriculture and inhabitation; the land with elevation between 200–500 m lies in transitional area between mountains and plains, accounting for 16.89% of the total area; the low-elevation mountainous area with elevation between 500–1,000 m lies in central and western regions, accounting

for 10.64% of total area; the mid-elevation mountainous area lies in western regions with elevation between 1,000–2,000 m, accounting for 4.83% of total area; the mountainous area with elevation more than 2,000 m, accounting for 0.01% of total area, which is very limited (Table 2).

5 Discussion and Conclusion

The Elevation Cluster Dataset Covering Henan province is the basic geographic data. It provides the overall terrain information, and geographical characteristics for various studies. Henan EVC shows that the area of plains with elevation lower than 200 m accounts for 67.63% of the total area in Henan province, the transition region of hills with elevation from 200 to 500 m account for 16.89% of the total area, and the mountainous areas of the province with elevation higher than 500 m account for 15.48% of the total area.

Author Contributions

Huang, Y. B. produced the dataset and wrote the paper. Liao, S. B contributed to the elevation classification, data quality control and paper review.

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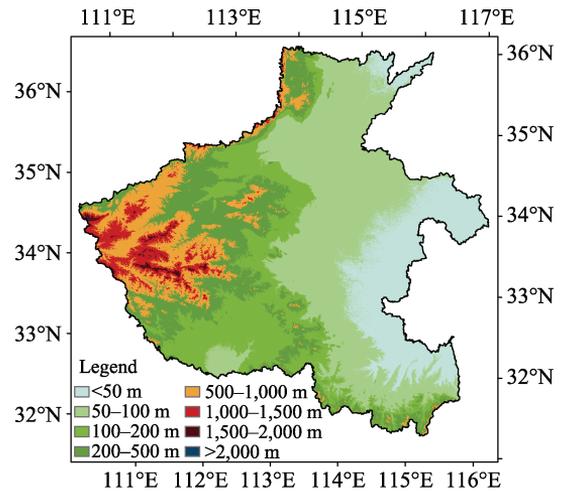


Figure 2 Elevation cluster dataset covering Henan province in China

Table 2 Statistics of elevation clusters in Henan province of China

Elevation (m)	Area (km ²)	Area (%)
<50	25,682.72	15.51
50–100	54,944.81	33.18
100–200	31,375.10	18.94
200–500	27,979.28	16.89
500–1,000	17,626.19	10.64
1,000–1,500	7,221.19	4.36
1,500–2,000	773.45	0.47
>2,000	21.97	0.01