Datasets of the boundary and area of the Tibetan Plateau

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Abstract: The Tibetan Plateau (TP) is an unique geomorphic region composed of specific geomorphic types, such as extreme high mountains, hills, plains, and plateaus of high altitude or sub-high altitude. There are different opinions as to the exact scope of the TP. According to the latest results of long-term fieldwork, questions related to the area and boundaries of the TP were reviewed geographically. The geomorphologic features were used to define the boundary. A 1:1,000,000 geomorphologic map was compiled based on a 1:100,000 aerial photographic map, a 1:500,000 topographic map, and the interpretation of satellite images. The boundary of the TP was delineated by referring to a relief map in 1:3,000,000 scale. The position of the boundary was quantitatively determined with GIS, and an electronic version of the map of the TP was compiled. The main conclusion is that: the TP starts from the southern edge of the Himalayan Range (not including the low Himalayas Mountains); abuts India, Nepal and Bhutan; connects to the northern edge of Kunlun, Altun and Qilian Mountains; and joins the Tarim Basin and Hexi Corridor in Central Asia. To the west of the TP are the Pamir and Karakorum Mountains, bordering on Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, and Kashmir. To the east of it are the Yulong Jokul, Daxueshan, Jiajin, and Qionglai Mountains as well as the south or east piedmont of the Mt. Minshan. The TP joins the Qinling Mountains and the Loess Plateau in its eastern and northeastern part. It ranges from 25°59′37″N to 39°49′33″N, and from 73°29′56″E to 104°40′20″E, covering an area of 2542.30×10^3 km^2, with a total boundary length of about 11,745.96 km.

Keywords: Tibetan Plateau; geographical unit; boundary; area; dataset

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1 Introduction

Many scholars have requested the dataset of the boundary and area of the Tibetan Plateau (DBATP) since the paper titled "A discussion on the boundary and area of the Tibetan Plateau in China" was published in Geographical Research in 2002. In view of the historical condition at that time, the dataset was not released together with the publication of the paper. Therefore, we sent the dataset to many scholars by unofficial release. With the unofficial release of the datatset from one scholar to another, there may have been some omissions or

errors during the process of data conversion or data transmission.

Now the Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences (IGSNRR, CAS) has officially launched the Global Change Research Data Publishing and Repository (http://www.geodoi.ac.cn), and the dataset is officially published. It can be cited and re-used. The dataset methods, quality control, validation, and conclusion have been published in the following paper: "A discussion on the boundary and area of the Tibetan Plateau in China". Here is the updated information on the description of the DBATP and how to cite it.

The original dataset in 2002 was produced by the Mapinfo platform; the dataset which has been released in 2014 was converted to the ARCGIS format (.shp). Based on the national boundaries dataset at the scale of 1:1,000,000, published in 2008 by the National Geomatics Center of China, and the county-level administrative boundaries of China dataset at the scale of 1:4,000,000, published in 2005 by the Data Sharing Infrastructure of Earth System Science Platform, the DBATP has been revised in terms of the southeastern boundaries of the Tibetan Plateau, and areas and percentages of each unit at county-level were re-calculated.

2 Dataset description

The descriptions of the boundary and area of the Tibetan Plateau (DBATP for short)

Table 1 Summary of the DBATP Metadata

Full name of dataset	Datasets of the Boundary and Area of the Tibetan Plateau
Short name of dataset	DBATP
Corresponding author	ZHANG Yili (zhangyl@igsnrr.ac.cn)
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Geographical region	Tibetan Plateau (TP) [1] starts from the southern edge of Himalayan Range (not including the low Himalayas Mountains); abuts India, Nepal and Bhutan; connects to the northern edge of the Kunlun, Altun, and Qilian Mountains; and joins the Tarim Basin and Hexi Corridor in Central Asia. To the west of the TP are the Pamir and Karakorum Mountains, bordering on Kyrgyzstan, Tajikistan, Afghanistan, Pakistan, and Kashmir. To the east of it are the Yulong Jokul, Daxueshan, Jiajin, and Qionglai Mountains, as well as the south or east piedmont of the Minshan Mountains. The TP joins the Qinling Mountains and the Loess Plateau in its eastern and northeastern part. It ranges from 25°59′37″N to 39°49′33″N, and from 73°29′56″E to 104°40′20″E.
Year of the dataset	2002, 2014 (revised)
Spatial resolution	1:1,000,000 scale
Data format	.kmz .shp Dataset size 288 KB
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
	National Data Sharing Infrastructure of Earth System Sciences of China, http://www.geodata.cn
Academic editors	LIU Chuang, SHI Ruixiang, WANG Zhengxing, 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 statistics of administrative counties in Tibetan Plateau (TP)[1-4]

Province	Number	Counties/county level cities (all of the lands are located in TP)	Counties/county level cities (part of the lands are located in TP)
Tibet	74	All of counties are included in TP, except a small part of Cona, Mêdog and Zayü counties.	
Qinghai	40	All of counties are included in TP, except a small part of Huzhu, Ledu and Minhe counties.	
Yunnan	10	Fugong and Gongshan	Lijiang, Yulong, Ninglang, Dêqen, Xianggelila, Weixi, Lanping, Lushui
Sichuan	47	Kangding, Batang, Daocheng, Xiangcheng, Litang, Seda, Garze, Yajiang, Jiulong, Derong, Xinlong, Daofu, Shiqu, Dege, Luhuo, Baiyu, Danba, Ruoergai, Hongyuan, Xiaojin, Aba, Rangtang, Heishui, Maerkang, Jinchuan, Lixian	Dayi, Pengzhou, Dujiangyan, Mianzhu,Shifang, Pingwu, Beichuan, Lushan, Baoxing, Tianquan, Shimian, Qingchuan, Luding, Xichang, Muli, Mianning, Yanyuan, Songpan, Wenchuan, Jiuzhaigou, Maoxian
Gansu	27	Luqu, Maqu, Diebu, Hezuo	Yongdeng, Tanchang, Wenxian, Minxian, Jiuquan, Yumen, Subei, Aksay, Zhuoni, Lintan, Zhouqu, Xiahe, Jishishan, Linxia, Hezheng, Kangle, Wuwei, Gulang, Tianzhu, Shandan, Minle, Gaotai, Sunan
Xinjiang	14	Taxkorgan	Ruoqiang, Qiemo, Shache, Yecheng, Hetian, Moyu, Luopu, Cele, Yutian, Minfeng, Pishan, Wuqia, Akto

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 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 DBATP dataset.

3　Method of dataset development

The method of dataset development has been described in the paper titled "A discussion on the boundary and area of the Tibetan Plateau in China" published in Geographical Research of 2002[1]. The basic

Table 3 Statistics of the counties whose part of land are located in the Tibetan Plateau (R$_i$)[2-4]

Province	County[a]	R_i	County	R_i	County	R_i
Tibet	Zayü	0.8827	Mêdog	0.4745	Cona	0.4003
Qinghai	*Huzhu*	0.9666	*Ledu*	0.9031	Minhe	0.2182
Yunnan	Lijiang	0.0707	Yulong	0.2670	Ninglang	0.3405
	Dêqen	0.9746	*Xianggelila*	0.9517	Weixi	0.5734
	Lanping	0.2357	*Lushui*	0.4672		
Sichuan	Dayi	0.0077	Pengzhou	0.1832	Dujiangyan	0.1555
	Mianzhu	0.1291	Shifang	0.2346	Pingwu	0.3058
	Beichuan	0.1404	Lushan	0.1003	Baoxing	0.5913
	Tianquan	0.1300	Shimian	0.3244	Qingchuan	0.0020
	Luding	0.5779	Xichang	0.0113	Muli	0.9991
	Minning	0.5039	Yanyuan	0.3242	Songpan	0.9665
	Wenchuan	0.8408	*Jiuzhaigou*	0.9482	*Maoxian*	0.9479
Gansu	Yongdeng	0.0136	Tanchang	0.1102	Wenxian	0.0829
	Minxian	0.0579	Jiuquan	0.0003	Yumen	0.0219
	Subei	0.7713	Aksay	0.2873	*Zhuoni*	0.9055
	Lintan	0.8363	Zhouqu	0.4473	*Xiahe*	0.9858
	Jishishan	0.2317	Linxia	0.2104	Hezheng	0.3173
	Kangle	0.2110	Wuwei	0.0700	Gulang	0.0013
	Tianzhu	0.4224	Shandan	0.0733	Minle	0.3164
	Gaotai	0.0010	Sunan	0.6831		
Xinjiang	Ruoqiang	0.4409	Qiemo	0.3596	Shache	0.0373
	Yecheng	0.5930	Hetian	0.8779	Moyu	0.0034
	Luopu	0.0212	Cele	0.3159	Yutian	0.2882
	Minfeng	0.4198	Pishan	0.4239	Wuqia	0.2598
	Akto	0.8554				

[a] The counties in italic type mean that the resident government is in the Tibetan Plateau.

procedure of the method is as follows. (a) According to the latest results of long- term fieldwork, questions related to the area and boundaries of the TP were reviewed

geographically. The geomorphologic features were used to define the boundary. (b) On the basis of these results, a 1:1,000,000 geomorphologic map was compiled based on a 1: 100,000 aerial photographic map, a 1:500,000 topographic map, and the interpretation of satellite images. The boundary of the Tibetan Plateau was delineated by referring to a 1:3, 000,000 relief map. The position of the boundary was quantitatively determined with GIS and GPS.

Figure 1   Dataset of the boundary of the Tibetan Plateau (.shp format)

4   Dataset structure

The dataset contains linear and polygon features. The linear features represent the boundary of the Tibetan Plateau and the polygon features produced by the closure of the linear features represent the geographic region of the Tibetan Plateau. The

Figure 2   Dataset of the boundary of the Tibetan Plateau (Google Earth .kmz format)

dataset is recorded in the format of geographic coordinates (longitude and latitude). The boundary length of the Tibetan Plateau is calculated in the coordinate system of Lambert conformal conic projection. The two standard parallels are 29°N and 37°N separately and the central meridian is 84°E. The total boundary length is 11,745.96 km. The area of the Tibetan Plateau is calculated in the coordinate system of Albers equal-area conic projection. The two standard parallels are 29°N and 37°N separately and the central meridian is 84°E. The total area is 2,542,298 km^2 (2,542,298,319,782 m^2).

The statistics of administrative counties in TP is listed in Table 2, in which the statistics of the percentages of areas in each county in TP is listed in Table 3.

The data visualization maps in the ARCGIS (.shp) and Google Earth (.kmz) formats are shown in Figures 1 and 2, respectively.

5   Discussion

Because the national boundaries dataset and the county-level administrative boundaries of China dataset have now been updated, there may be some differences in the results between the v1.0 (2002) dataset version and the v1.1 (2014) dataset version in the
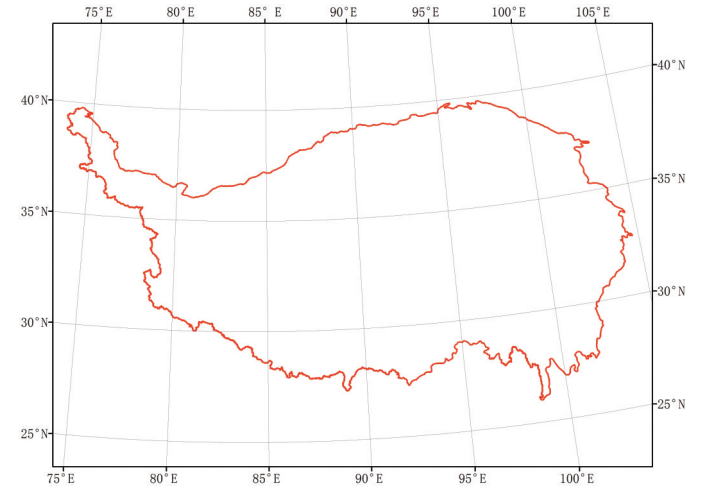
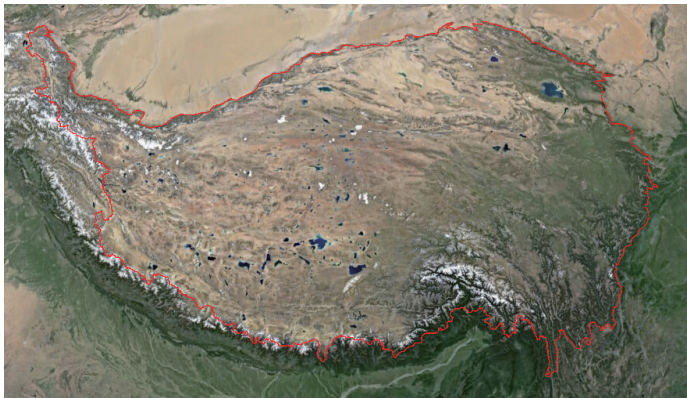southeastern boundaries of the Tibetan Plateau. The county-level administrative regions in the Tibetan Plateau and the statistics of the counties whose part of land are located in the Tibetan Plateau are also updated.

References

[1] Zhang Yili, Li Bingyuan, Zheng Du. A discussion on the boundary and area of the Tibetan Plateau in China. Geographical Research, 2002, 21(1): 1-9.
[2] Zhang Yili, Zhang Wei, Bai Wanqi et al. An analysis of statistical data about Tibetan Plateau in China: A case study on population. Progress in Geography, 2005, 24(1):11-20.
[3] The National Geomatics Center of China. The national boundaries dataset at the scale of 1:1,000,000. 2008.
[4] The Data Sharing Infrastructure of Earth System Science Platform. The county level administrative boundaries of China at the scale of 1:4,000,000. 2005.