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Spatial Dataset of the Islands and Reefs Occupied by Vietnam in the South China Sea

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Abstract: Spatial and geographical information of 29 islands and reefs (including 4 islands, 15 reefs, 3 sandbanks, 5 shoals and 2 underwater shoals) in South China Sea occupied by Vietnam during 1972–1998 was collected in the dataset. In which, there are 9 islands during the 1970s (Hongxiu Dao, Anbo Shazhou, Dunqian Shazhou, Jinghong Dao, Nanwei Dao, Nanzi Dao, Bisheng Jiao, Ranqing Shazhou, Zhong Jiao), 13 during the 1980s (Bolan Jiao, Daxian Jiao, Dong Jiao, Guihan Jiao, Liumen Jiao, Nailuo Jiao, Nanhua Jiao, Riji Jiao, Wumie Jiao, Xi Jiao, Bo Jiao, Qiong Jiao, Wanan Jiao), and 7 during the 1990s (Guangya Jiao, Pengbobao Jiao, Renjun Tan, Lizhun Tan, Xiwei Tan, Aonan Ansha, Jindun Ansha). The dataset is archived in .shp and .kmz formats with the data size of 6.5 KB after compression.

Keywords: Nansha Islands; Vietnam; islands and reefs; occupy; 1973−1998

1 Introduction

The Nansha Islands located in the south-eastern South China Sea (SCS), including Xiongnan Tan (11°57′00″N, 116°40′00″E) in the north, Zengmu Ansha (03°57′44″N–03°59′00″N, 112°16′25″E–112°17′10″E) in the south, Wanan Tan (07°32′00″N, 109°30′00″E) in the west and Haima Tan (10°43′00″N–10°51′00″N, 117°44′00″E–117°50′00″E) in the east, and covering an area of 823,000 km^2. Totally, there are 287 islands and channels distributed along the N-S three-steps continental slope[1–2].

Chinese people have a long history using the SCS as a fishing ground and as an important pass way to other countries. Marine products from the SCS were found in historical records since the Three-Kingdoms period (220–280 A.D.). Trade routes between Southeast Asian countries gradually emerged during the Han Dynasty (202 B.C. to 220 A.D.) by using the SCS. More important shipping routes were developed across the SCS during the Jin to Tang Dynasty (226–907 A.D.), as the rise in the Buddhist culture increased the demand to import Indian scriptures by sea. New trade routes to Southeast Asia, India, and Africa were opened

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[2] Tang, M. Spatial dataset of the islands and reefs occupied by Vietnam in the South China Sea [DB/OL]. Global Change Research Data Publishing and Repository, 2016. DOI: 10.3974/geodb.2016.02.19.V1.

up through the SCS as a result of Zheng He's seven voyages (1405−1433 A.D.) in the Ming Dynasty.

The modern geological surveys and studies on SCS started in the1980s[3–4], mainly focused on the natural geographic environment[5–6], coral reef geomorphology[7–9], back-arc basin geological history[10–11], semi-quantitative analysis of economic, political, and natural value of Nansha Islands[12], and engineering geology studies[13]. Calculation of strategic value and analysis of the development potential were based on geographic parameters such as location, size, and water depth. Spatial interpolation, reclassification and grid calculation were operated in ArcGIS10.1. The results provide rational support for asserting maritime rights and interests and solving the South China Sea dispute[14].

2 Metadata of Dataset

Table 1 summaries the metadata of the spatial distribution dataset of the islands and reefs occupied by Vietnam in South China Sea, including: dataset full name, dataset short name, author, study area, publish and shared service platform and policy, etc.

Table 1 Metadata summary of spatial distribution dataset of the islands and reefs occupied by Vietnam in South China Sea[15]

Item	Description
Dataset full name	Spatial dataset of the islands and reefs occupied by Vietnam in the South China Sea
Dataset short name	29IslandsReefsInNanshaIslands(1973−1998)
Authors	Meng, T. M-4463-2016, Collaborative Innovation Center of South China Sea Studies, Nanjing University, tame159@qq.com
Geographical region	South China Sea (5 °N−12 °N, 109 °E−114 °E)
Data Time	1973−1998
Data Formats	.kmz, .shp
Data Size	.kmz (3.60 KB), .shp (2.90 KB) (after compression)
Data files	Data stored as .shp files in the dataset are correlated to .kmz format in Google Earth
Foundation(s)	Chinese Academy of Sciences (2016ZWH005A-005)
Data publisher	Global Change Research Data Publishing and 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 *Journal of Global Change Data & Discovery*). ***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 percent 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[16]

3 Methods

Sea bed morphology was based on interpolation of water depths and isobaths extracted from 11 charts (Table 2) by ArcGIS 10.1, in Mercator projection and CGCS 2000 coordinate system. Precise proportion of islands and reefs, and occupied date were from the literature[12–13].

Table 2 Information on maritime charts in this study[14]

Chart ID	Publication date	Projection	Scale	Chart name
18100	Jan. 2013	Mercator projection	1：250,000 (12 °)	Shuangziqun Jiao to Zhenhequn Jiao
18102	Jun. 2012			Wanan Tan to Guangya Tan
18103	Jan. 2013			Huanglu Jiao to Nanan Jiao
18104	Mar. 2013			Zengmu Ansha and Approaches
18200	Jan. 2013			Liyue Tan
18300	Feb. 2013			Yongshu Jiao to Yinqing Qunjiao
18400	Mar. 2013			Zhenghe Qunjiao to Yongshu Jiao
18500	Feb. 2013			Nanfang Qiantan to Haikou Jiao
18600	Dec. 2012			Yinqing Qunjiao to Nanwei Tan
18700	Feb. 2013			Wumie Jiao to Huanglu Jiao
18800	Jan. 2013			Haikou Jiao to Yuya Ansha

4 Results and Verification

4.1 Results

(1) Spatial Distribution

This study covered the area ranging from 7 °N–12 °N and 109 °E–115 °E, containing 29 islands and reefs (4 islands, 15 reefs, 3 sandbanks, 5 shoals, and 2 underwater shoals).

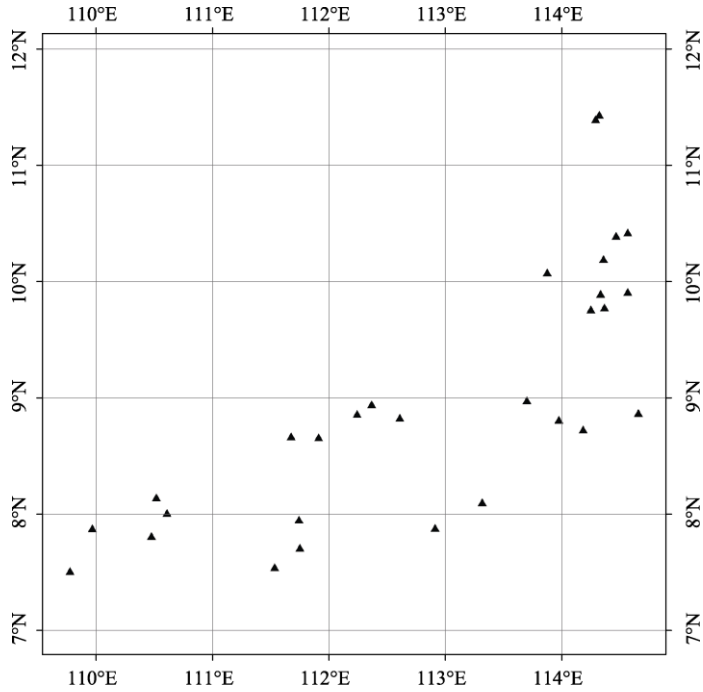

Figure 1 Location of islands and reefs occupied by Vietnam in the South China Sea[15]

(2) Occupation Process

Islands and sandbanks with good living conditions were occupied first. Reefs and shoals were occupied later by constructing simple blockhouses during 1988–1990, and underwater shoals were the last to be occupied (Table 3).

Table 3 Types and date of occupation of islands and reefs[14]

Name	Type	Longitude (E)	Latitude (N)	Year of occupied
Hongxiu Dao	Island	114°21′29″	10°10′59″	1973
Nanzi Dao	Island	114°19′19″	11°25′30″	1973
Dunqian Shazhou	Sandbank	114°28′0″	10°22′59″	1973
Jinghong Dao	Island	114°19′59″	9°52′59″	1973
Nanwei Dao	Island	111°54′39″	8°39′0″	1973
Anbo Shazhou	Sandbank	112°54′42″	7°52′12″	1973
Ranqing Shazhou	Sandbank	114°34′0″	9°54′0″	1978
Zhong Jiao	Reef	112°22′0″	8°55′59″	1978
Bisheng Jiao	Reef	113°42′0″	8°58′0″	1978
Nailuo Jiao	Reef	114°17′26″	11°23′9″	1988
Daxian Jiao	Reef	113°52′30″	10°4′0″	1988
Bolan Jiao	Reef	114°34′0″	10°24′39″	1988
Guihan Jiao	Reef	114°15′0″	9°45′0″	1988
Dong Jiao	Reef	112°36′29″	8°49′0″	1988
Xi Jiao	Reef	112°14′30″	8°51′0″	1988
Riji Jiao	Reef	111°40′29″	8°39′29″	1988
Liumen Jiao	Reef	113°58′29″	8°48′0″	1988
Nanhua Jiao	Reef	114°10′59″	8°43′0″	1988
Wumie Jiao	Reef	114°39′29″	8°51′29″	1988
Qiong Jiao	Reef	114°22′0″	9°46′0″	1989
Wanan Tan	Shoal	109°46′30″	7°30′0″	1990
Bo Jiao	Reef	113°19′0″	8°5′30″	1987
Guangya Tan	Shoal	110°31′0″	8°7′59″	1990
Renjun Tan	Shoal	110°36′29″	8°0′0″	1990
Pengbobao Jiao	Reef	111°44′30″	7°56′30″	1989
Lizhun Tan	Shoal	110°28′29″	7°48′0″	1991
Xiwei Tan	Shoal	109°58′0″	7°52′0″	1991
Jindun Ansha	Shoal (underwater)	111°31′59″	7°31′59″	1998
Aonan Ansha	Shoal (underwater)	111°45′0″	7°42′0″	1998

4.2 Spatial Verification with Google Earth Image

The correlation between this dataset and Google Earth is shown in Figure 2. The data points are shown as yellow pins overlapping with the Google Earth image.

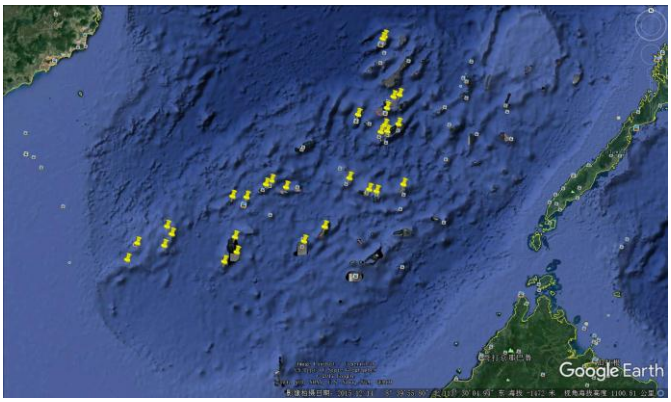

Figure 2 Data overlaid on Google Earth image

References

[1] Zhao, H. T. Physical Geography of Nansha Islands [M]. Beijing: Science Press, 1996: 35−60.

[2] Wang, Y. China Marine Geography [M]. Beijing: Science Press, 1996: 74−87.

[3] Chinese Academy of Sciences. Report on the comprehensive survey of Spratly Islands and its adjacent sea area (Vol. 1) [R]. Beijing: Science Press, 1989: 11−106.

[4] Chinese Academy of Sciences. Report on the Comprehensive Survey of Spratly Islands and its adjacent sea area (Vol. 2) [R]. Beijing: Science Press, 1989: 15−53.

[5] Chen, S. J. The natural survey of Spratly Islands [J]. *Marine Science Bulletin*, 1982(1): 52−58.

[6] Zhao, H. T. Integrated physical geographical regionalization of the Nansha Islands [J]. *Tropical Geography*, 1982, 16(4): 304−309.

[7] Zhao, H. T, Song, C. J., Zhu, Y. Z. Geomorphic and modern sedimentary features of coral reefs in the hinterland of 'dangerous ground', Nansha Islands [J]. *Quaternary Sciences*, 1992, 12(4): 368−377.

[8] Zhao, H. T., Song, C. J., Lu, B. A preliminary exposition of coral reef engineering geology [J]. *Journal of Engineering Geology*, 1996, 4(1): 86−90.

[9] Zhao, H. T., Wang, L. R., Song, C. J. Geomorphological model of coral reefs in the South China Sea [J]. *Acta Oceanologica Sinica*, 2014, 36(9): 112−120.

[10] Zhao, H. T., Zhu, Y. Z., Sha, Q. A. A study on the quaternary system of Yongshu Reef in Nansha Islands. *Tropical Geography*, 1994, 14(2): 97−104.

[11] Zhao, H. T., Wen, X. S., Sun, Z. X., *et al*. Regional geology, geomorphology and paleooceanography of the Nansha Islands [J]. *Tropical Geography*, 1995, 15(2): 128−137.

[12] Zhang, H. X. Strategic value evaluation of Nansha Islands, South China Sea [D]. Nanjing: Nanjing University, 2014: 25−157.

[13] Wang, Z. X. Study on engineering geological properties of coral reefs and feasibility of large project construction on Nansha Islands [D]. Wuhan: Institute of rock and soil mechanics, Chinese Academy of Sciences, 2008: 25−150.

[14] Tang, M. Spatial distribution characteristic and strategic situation of the islands and reefs Invaded by Vietnam in the Chinese Nansha Islands [J]. *Tropical Geography*, 2015, 35(5): 739−744.

[15] Tang, M. Spatial dataset of the islands and reefs occupied by Vietnam in the South China Sea [DB/OL]. Global Change Research Data Publishing & Repository, 2016. DOI: 10.3974/geodb.2016.02.19.V1.

[16] GCdataPR Editorial Office. GCdataPR data sharing policy [OL]. DOI: 10.3974/dp.policy.2014.05 (Updated 2017).