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Toward a Diachronic Digital Gazetteer for Historical Studies: A Case Study of Place Names in Vietnam on *Gaihozu*

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Abstract

Information of place names and their locations of present days can be easily acquired through various services on the Internet. But that of old days can be obtained limitedly by referring to old gazetteers and old maps. In such old gazetteers, geographic coordinates of places are listed; however, reference geodetic coordinate system is rarely mentioned. So, to evaluate the accuracy of place names and their locations listed in old gazetteers, old maps of same period are requisite. As changes in place names are common in general, old names in old maps and old gazetteers are also essential to integrate snapshot gazetteers to a diachronic gazetteer.
Gaihozu are maps of the areas outside the Japanese territory prepared by former Japanese army, and thanks to the Gaihozu Digital Archive maintained by Tohoku University, many maps are accessible through the Internet. Many of *Gaihozu* maps are reprint of maps issued by local authorities in early 20th century, for example, the Geographic Service of French Indochina for Vietnam and the Map Department of Thailand for Thailand. Unlike the maps of Thailand in early 20th century, many triangulation stations are shown on maps of French Indochina. Provided that these triangulation stations are identified on present day maps, locations of place names existed in almost a century ago on the modern geodetic coordinate system can be easily obtained, and locational accuracy can be evaluated.

Keywords: gazetteer; Vietnam; Gaihozu

1. Introduction

Information of place names and their locations of present days can be easily acquired through various services on the Internet. But that of old days can be obtained limitedly by referring to old gazetteers and old maps. In such old gazetteers, geographic coordinates of places are listed; however, reference geodetic coordinate system is rarely mentioned. So, to evaluate the accuracy of place names and their locations listed in old gazetteers, old maps of same period are requisite. As changes in place names are common in general, old place names in old maps and gazetteers are also essential to integrate snapshot gazetteers to a diachronic gazetteer which may provide an essential fundamental information of social dynamics and diversity of the area. In the previous GIS-IDEAS, Nagata 2014 reported on a study on place names listed in a Japanese gazetteer during the World War II.

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2. Study Area and Materials

In this study, one sheet was selected as a case from the *Gaihozu* maps with major index title as French Indochina. It is titled as 'Saigon' and was published in 1941 by former Japanese army which was simply reprint of French edition issued in 1936 by the Geographic Service of French Indochina with scaled 1 to 500,000. Since the original French edition covers too wide in longitude, the reprint Japanese edition is divided into two pieces for convenient handling. So, in Japanese edition, 'right' and 'left' are used as suffix label of index number. Thus, there are two different maps titled as 'Saigon' in Japanese edition, and the right half of the original French edition, number 17 right, was used in this study, hereinafter referred to as 'Gaihozu Saigon' in this article.

Coverage of Gaihozu Saigon is from 115 to 117.3 gradians East of Paris Meridian and from 11.45 to 13.97 gradians North, which can be converted as from 105.84 to 107.90 degree East of Greenwich Meridian and from 10.31 to 12.58 degree North. Major cities in this sheet are Saigon, My Tho, Tay Ninh, and Bien Hoa. About 75% of the area is territory of Vietnam, and the rest part is territory of Cambodia.

About one thousand place names of city, village, railway station, and mountain are on this map in the territory of Vietnam, which can be used to examine locational accuracy by identifying their places on later topographic maps, AMS L7014 series scaled 1 to 50,000.

The density of place names on Gaihozu Saigon is about 200 per one square degree or 1 per 20 square kilometers. This density is almost similar to density of place names on *Gaihozu* of northeastern Thailand, though their scale is 1 to 200,000.

2.1. Identifying place names

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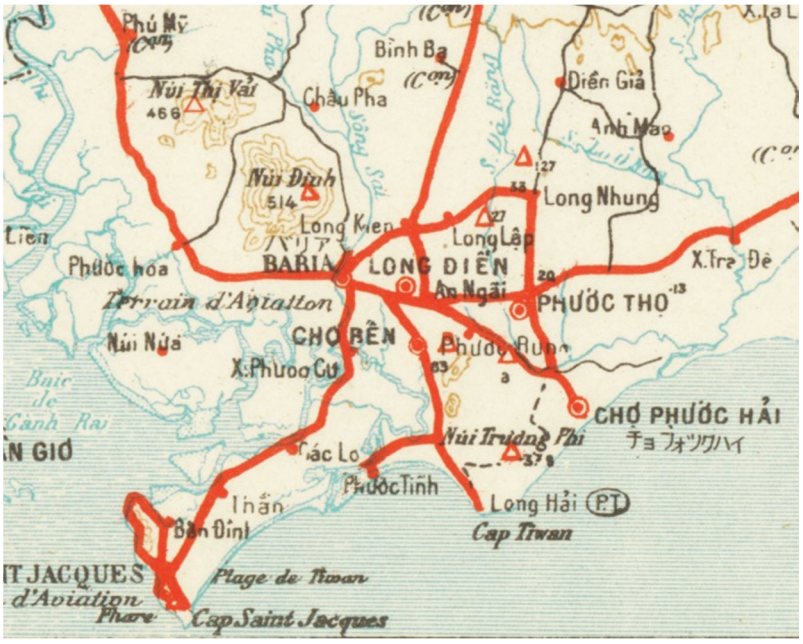
At present, 222 place names including 10 triangulation stations could be identified their corresponding places on AMS L7014 series maps. As one primary purpose of this study is to evaluate locational accuracy of place names, their geocoordinates are required in reasonable resolution. In this sense, location of each place is to be collected by the unit of 0.1km, since the reference maps, L7014, are with UTM grid by the unit of 1km.

There are some difficulties to identify a place name or to determine its central location on a reference map. In Gaihozu Saigon, village names in local ethnic language are found in many cases as of 1930s, and some of them had been changed to different names in Vietnamese on later maps, L7014, as of 1960s. Some of such cases can be identified as same village, if change in name is slight, for example, 'Phum Soai Kong' in Khmer and 'Ap Soai Kong' in Vietnamese. In mountainous area, there are many non-Vietnamese nor non-Khmer place names, and many of them are shown in region with insufficient geographic environment on Gaihozu Saigon.

The ellipsoid of reference applied to maps of late 19th century is the Clarke 1880 (Mugnier 2002). Though the geodetic datum applied to Gaihozu Saigon is unknown, geocoordinates extracted from Gaihozu Saigon were converted to values based on the current global WGS84 datum. Also geocoordinates of corresponding places on L7014 maps were converted to values of the WGS84 datum. Then, locational accuracy can be examined.

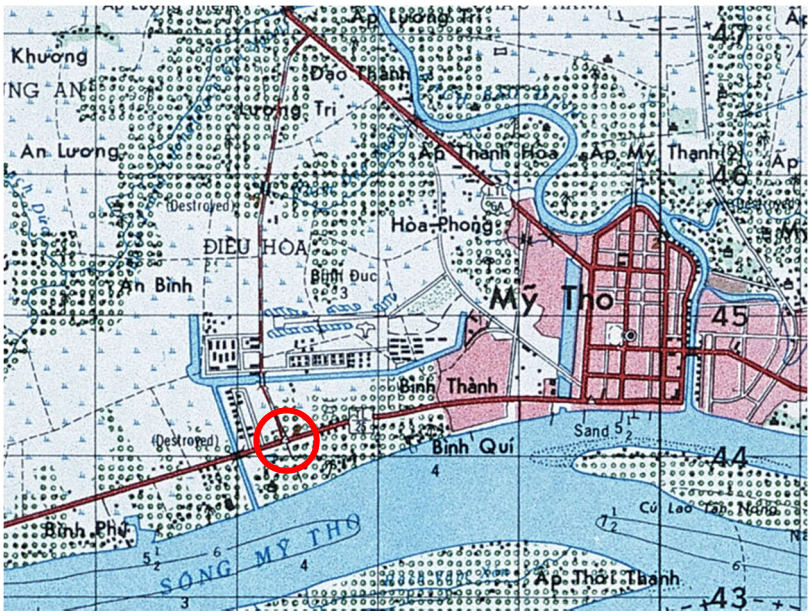
2.2. Triangulation Stations

Triangulation stations are important ground control points. In Fig.1 below, red triangle mark shows a triangulation station. Most of them are located at the peak of mountains, and some are located on river bank. On Gaihozu Saigon, 10 stations could be identified their corresponding stations on L7014 maps. Fig. 2 shows an example of triangulation station along a major road near My Tho. Average errors in location of triangulation stations is about 0.64km or only 1.3mm difference on Gaihozu Saigon since it is scaled 1 to 500,000.



Source: "Saigon" French Indochina No.17 Right, Gaihozu Digital Archive

Fig. 1. Triangulation Stations Shown on a *Gaihozu*



Source: "My Tho" AMS L7014

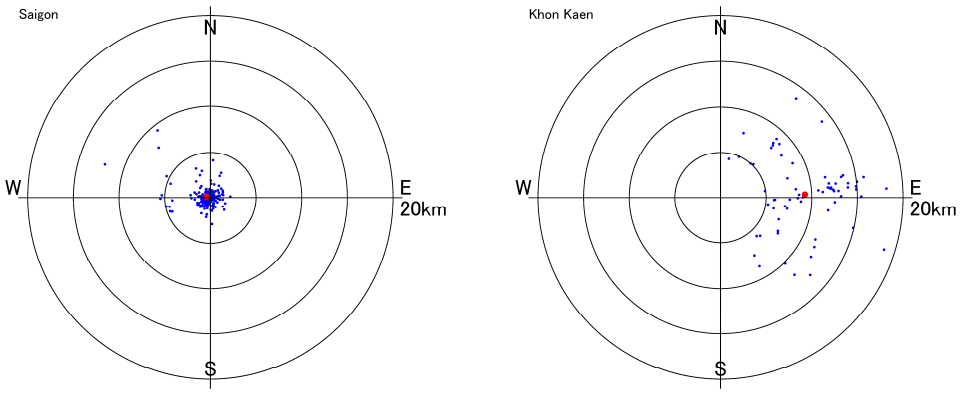
Fig. 2. Triangulation Station near My Tho on L7014 map

2.3. Accuracy of Location

The geodetic datum of Gaihozu Saigon is unknown; however, errors in location of triangulation stations are only 0.63km in average. Simple parallel translation can be applied so that the gravity center of location of stations identified on Gaihozu Saigon and that obtained on L7014 become equal geocoordinates. Then, errors in location of triangulation station become smaller to 0.41km in average. After same parallel translation is applied to locations of places extracted from Gaihozu Saigon and identified on L7014, average error in location of 222 places is 1.14km.

Fig. 3 shows distribution of errors in location. Blue dot shows error of one place, and the red big dot shows the gravity center of errors. As shown in Fig. 3(a), locational error of most places is less than 2km. Some places show error of 10km or so, but such places are in mountainous area and information of geographic environment

drawn on map is incomplete. Fig. 3(b) shows distribution of errors of a case of 'Khon Kaen' in Thailand for comparison. For the case of Khon Kaen, average error is almost 10km and the worst distant place is almost 20km far from actual location.



(a) Saigon (b) Khon Kaen

Fig. 3. Errors in Location

3. Discussions

As far as sample examination on Gaihozu Saigon, locational accuracy can be said to be fair. About 67% of places are drawn within the difference of 1km, and 34% are within the difference of 0.5km. On a map of scale 1 to 500,000, the difference is 2mm and 1mm respectively. Such places are located in lowland. This locational accuracy may contribute to link an old place name and a new name even if they are different name.

But many places located in mountainous area are difficult to identify their current location. Locational accuracy is relatively poor than that of lowland. And furthermore, changes in place names from name in local language to name in standardized language make more difficulty to identify their continuity of community. At the same time, old local place names show the ethnic diversity in early 20th century and changes in name may indicate dynamics of local communities.

Acknowledgements

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