A Spatial analysis of Population Change in Keihanshin Area from Meiji Era to Today;By using a Requisition Order List 1891 and DEM.

Hiromasa Watanabe[1]; Yuji Murayama[2]; Takehiro Morimoto[3]; Akio Yamashita[4]; Kazufumi Fujita[5]

[1] Graduate student,Univ.of Tsukuba; [2] Univ. Tsukuba; [3] Life and Envir. Sci., Univ. of Tsukuba; [4] Rakuno Gakuen Univ.; [5] Graduate Student, Univ.of Tsukuba

http://land.geo.tsukuba.ac.jp/teacher/murayama/datalist.htm

1. Introduction

The purpose of this paper is to analyze a spatial change of the population distribution in Keihanshin Area from 1891 to 2000 in terms of the relation to topography. There have been many modern Japanese statistics or census, especially, Requisition Order List(Chohatsu Bukken Ichiran Hyo) in Meiji era is notable for its small statistical unit ; the unit recorded was compiled at municipality level at that time. Because of this reason, Requisition Order List has been analyzed in several reports in terms of the spatial distribution a pattern of human activities. Although the spatial arrangements of human activities can be recognized from these reports, analyzing the factors is still room for further study, especially in terms of the environmental factors. Additionally, these reports have analyzed only at that time, so it's needed to analyze more longer-term changes. Then, in this paper, we have applied the methods in Fujita et al. (2005), and analyze the relationships between human activity and the environmental factors with GIS. Specifically, from case study in Keihanshin area, Japan, the relationships between a spatial change of the population distribution and the topographic factors are analyzed.

2. Data and research methods

2-1.Data

In this research, three data were used;(A) Requisition Order List in 1891(.csv format);(B) A national census in 2000(.shp format);(C) Digital elevation model(.asc format).To process every data, ArcGIS9.1 and the extension tools (e.g;spatial analyst) were used.

2-2.Research methods

This research has been progressed as follows;

Step1: The original numbers are provided for every municipalities recorded in A. Then, the numbers are 8 digits; first 2 represent prefecture, next 3 city or county and last 3 municipality, respectively.Step2: The same numbers are provided for every statistical unit in B with reference to some documents (see Fujita et al 2005.).Step3: The polygons expressing every municipalities in 1891(D) are built by dissolving B. At the same time, the population, the population density, and the area of every municipalities in 2000 are calculated.Step4: By joining D with A, the population and the population density of every municipalities in 1891 are calculated. Additionary, the rate of population change from 1891 to 2000 is also calculated.Step5: By overlaying D with C, mean height (meters) and slope (degrees) of every municipalities in 1891 are calculated.Step6: By using these processed values, a spatial change of population distribution from 1891 to 2000 is analyzed.

3. Results

The results of analysis are described as follows;

1. The population distribution and density in 1891 around Keihanshin Area can be observed and the long-term population change from 1891 to 2000 can also be confirmed.2. The spatial pattern of the denser populated area in each time tends to be distinguished in these areas which have moderate topographic values. This tendency has become strong in 2000, as compared with 1891.3. The spatial pattern of the rate of population change was distinct; that of the north mountainous area was low or negative rate and that of the south plain area, especially along Osaka bay area, was very high rate. It can be considered that this overt spatial contrast is assigned not only to the topographic conditions but the socio-economic conditions set by topographic conditions.

Reference

Fujita, K., Murayama, Y., Morimoto, T., Yamashita, A., and Watanabe, H. 2005. A Spatial Analysis of Population Change in Tokyo Metropolitan Area from Meiji Era to Today-By using a Requisition Order List 1891 and DEM Data-. Proceedings of GISA 15, 61-66.