

Estimation and presentation of the spatial statistics analysis of the Earth scientific informations by R-Language

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The estimation of the spatial distribution of the structural shift of the quartz from a granite rock body in the Northwest area of the Okayama city was attempted to perform using the spatial statistics. The structural shift of the quartz were detected by the X-ray structural analysis. In this study, the spatial statistical analyses were performed by the combination of some applications.

The auto-correlation of the data was estimated using the kriging method (Matheron, 1973). Moreover, to minimize the estimation error, the Universal kriging, the kriging procedures using the auxiliary maps was employed. Each auxiliary data was generated from the public open data using with the data integration algorithm developed in this study. The first auxiliary data was a digital elevation model (DEM). The original DEM data was given by the Geospatial Information Authority of Japan. The second auxiliary data was a buffer model. In this study, the boundary of a geologic feature was selected as the buffer reference line. The boundary data of the granite body was extracted from the Seamless Digital Geological Map (1:200,000) that was published by the Geological Survey of Japan. A multi buffer map was generated as the buffer model using the GIS application. The all coordinates of the data at the geospatial calculations are converted to the Japanese Geodetic Datum 2000 (JGD2000) System V. Because of this unifying process, the all geospatial statistics calculations can avoid the error caused by the displacement of the position.

The prediction of the estimated distribution of the structural shift that take into account the altitude was shown. The projection method of the predicted map was converted to latitude and longitude coordination with WGS84 ellipsoid. The appropriate script coded by the Keyhole Markup Language (KML) was generated to plot the map with the Google earth. In the application, the map was automatically overlaid on the geographical data and the surface image of the Google earth. The qualitative analysis of the map compare with those geographical features by the arbitrary three dimensional directions and the magnification factor was enabled.

The all procedures could be performed using the non-proprietary applications in satisfactory precision. The Google earth representation may be useful for the qualitative analysis of the estimation map. In the high altitude and the marginal part of the rock body, the estimated structural shift was relatively high. The mineralogical and the petrological descriptions for the estimated distribution will require the further investigations.

Keywords: GIS, Spatial statistics, Kriging, R-Language, Google earth

Laplacian map representation method for landform lineament elements by LiDAR DEM

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In the case of obtaining landform lineament elements such as knick lines (convex and concave) and valley and ridge lines from Laplacian maps by LiDAR DEM, because landform elements intended to be obtained are buried due to noise of minute irregularities in the ground surface if detailed data is used as it is, it becomes necessary to perform averaging in a certain range. For identifying stepped landforms of a few tens of centimeters or more formed on a slope having random irregularities on the order of 20 to 30 cm in the ground surface using DEM with a grid spacing of 1 m, the most effective method is averaging a range of 5 to 9 grids square and using a Laplacian value $0.05 \sim 0.1$ as a threshold. For a more quantitative evaluation of the stepped landforms, it becomes necessary to also use averaging in a range of 3 grids simultaneously. When DEM with coarser grid spacings are used, almost equal results are obtained in averaging ranges of 5 grids up to a grid spacing of 2 to 3 m, but with a spacing of 4 m or more, it is difficult to identify stepped landforms on the order of a few tens of centimeters or more.

Keywords: LiDAR DEM, Mass Movement, Laplacian, Convex, Concave

Estimation of basal surface of Holocene based on buried surface at Nakagawa lowland, Central Japan

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In Japan, Holocene is thickly deposited at coastal plain area concentrating large cities. Holocene is often deposited under groundwater surface, is unconsolidated, and constructs soft-ground. Therefore it is necessary to clarify the precise distributions of Holocene for construction works or earthquake disaster prevention.

This study is aimed to present a method of surface estimation for basal surface of Holocene in consideration of buried surface. The borehole database used in this study is from the Borehole Database for Urban Geology Project of AIST, Geological Survey of Japan. Unlike conventional studies of the basal surface of Holocene, cluster analysis and voronoi diagram are used for quantitative verification of estimated surface. The basal surface of Holocene with obvious boundary of buried surface can be estimated.

Keywords: estimation of geological surface, basal surface of Holocene, buried surface

Digital Japan Web. NEXT

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1. Introduction

The Geospatial Information Authority of Japan (GSI) proposed the concept of "Digital Japan" which aims the society where geospatial information is shared and highly utilized on a computer network. To realize this "Digital Japan", the GSI developed Digital Japan Web System in 2003 (Ono et al., 2004), improving it to be used especially in the national and local government office. In recent years, web map service of private corporations is becoming popular, such as Google Maps, and the society where everyone gets used to web maps is being established. However, although many people get used to web maps in daily life, it is not yet in the situation that the national and local government officers utilize geospatial information to increase the efficiency of their work.

On the other hand, the GSI defines "The Fresh Map 2011" (GSI, 2011) and "The Fresh Map 2012" (GSI, 2012) as an action plan for maintenance and practical use of the Digital Japan Basic Map. That action plan says that "The GSI proposes a solution and implements follow-up to government officers for satisfying their business needs when they use the Digital Japan Basic Map". The GSI defines "Digital Japan Web" as the general term of the Digital Japan Web system, maps, aerial photos, and the website where maps and aerial photos are displayed. It aims at playing the central role of proposing a solution and implementing follow-up to government officers when they used the Digital Japan Basic Map in their work.

This paper reports measures currently taken in developing Digital Japan Web (hereinafter referred to as Digital Japan Web. NEXT), in order to realize the contents written in The Fresh Map.

2. Main Features and Functions

The following improvement was performed for the promotion of utilization of Digital Japan Web. NEXT.

2.1. Map Data

In addition to the standard map, "The Monotone Map" and "The Blank Map" were added.

These maps are added for the purpose of being inserted in documents which are frequently created in usual business.

2.2. Function

In addition to the function which Digital Japan equipped until now such as map displaying, drawing vectors, etc., added reading and preserving of an KML function. Although the GSI supports an original XML format as a standard format for Digital Japan Web System, the cooperation with other GIS software was difficult when the data of this format is used. By supporting KML on Digital Japan Web. NEXT, it becomes possible to display the data created by other GIS software or to display the data created by Digital Japan Web. NEXT on other GIS software. It is expected that utilization of geospatial information will be promoted.

2.3. Website Interface

The website interface of the former Digital Japan Web differed from ones of private corporations. Therefore, the user who visited Digital Japan Web System website could not use the functions intuitively, and this has become a prevention factor when they use this website. In order to solve this problem, the website interface of Digital Japan Web. NEXT, is designed referred to the web map service of private corporations which users utilize in their daily life.

This enabled them to use Digital Japan Web. NEXT in business intuitively.

3. Future Schedule

Digital Japan Web. NEXT, will be developed based on user's needs. As an example, various geospatial information that the GSI holds will be displayed on one website. Moreover, the function which users can display their geospatial information easily will be added. By this, the information which users hold can be connected to maps and other geospatial information easily, and it is expected that the increase in efficiency of daily work.

References

Hiroyuki Ohno, Kazuhiko Akeno, Fumio Hisamatsu, and Takayuki Ishizeki (2004), Digital Japan Web System, Bulletin of the Geographical Survey Institute, 104, 25-33.

GSI (2011), Fresh Map 2011, <<http://www.gsi.go.jp/common/000063518.pdf>>

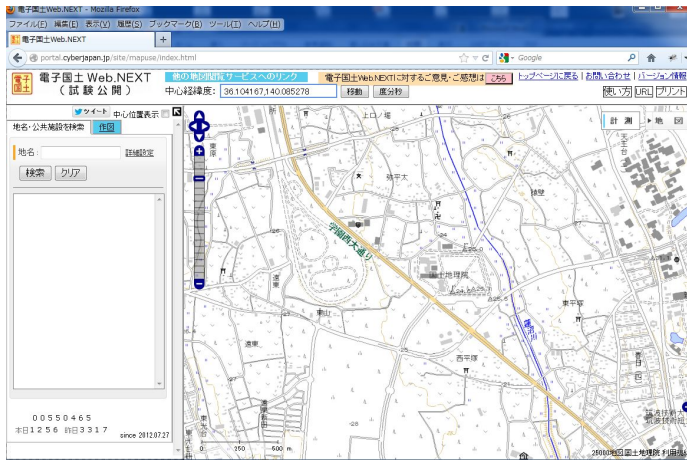
GSI (2012), Fresh Map 2012, <<http://www.gsi.go.jp/common/000076766.pdf>>

Keywords: Web, GIS, Map, Digital Japan

HTT30-04

Room:102A

Time:May 21 09:45-10:00



Hazard mapping on school road and its spatial characteristics -A case study of elementary school in Tsukuba city-

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The interest of safety and security of the region grow rapidly in Japan, such as crime prevention map, and disaster prevention map has been created with a lot of elementary school. We have held a workshop to consider the safety of school routes with school children and their parents together while walking the school route in elementary school area in Tsukuba, Ibaraki Prefecture. The purpose of this study is to clarify the spatial characteristics of hazardous locations that have been selected by their parents in this workshop. At the workshop, We got a map of 108 sheets filled out the dangerous place related to traffic, crime, and disasters, and the reason for its selection. In traffic hazard, we had the characteristics, such as the large amount of traffic and narrow road with no sidewalk. There were also the characteristics, no buildings around and the presence of forest and bushes, such as dark in crime hazard, and the collapse of the walls of the house in disaster hazard. In particular, crime and disaster hazard, had been influenced by the distance from buildings and building density.

Keywords: hazard mapping, elementary school, Tsukuba city, spatial characteristics, school road, density surface

Discovery of landscape resources based on railway network using social media

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Human behavior always involves something to more. People move on foot, by bicycle, by car, by rail and so on. Among them, the sequential landscape viewed from the railway network analyzed has been often. However, the railway also is important as the viewed object at present. In this study, the authors are going to analyze the landscape objects on railway networks by using geo-information technologies. Sequential Landscape the visible area of the natural elements viewed from the railway networks are calculated in the Kinki district from the viewpoint of the sequential landscape. On the other hand, in the case of the railway as the viewed object, the authors used picture-community site on internet where multiple users can access images. In concrete, the Osaka ST. is evaluated as one of the landscape resources for the existing railway network, Japan Railway West. And the railway landscape as the viewed objects were found around the Tokaido Line. As a result, the area that is characterized in the railway was clarified in detail.

Keywords: landscape, railroad network, picture-community site