HTT29-01   Room:102A   Time:May 22 13:45-14:00

Database of altitudinal distribution of mountain glacier in high Asian mountains

NUIMURA, Takayuki[1]*, SAKAI, Akiko[1], FUJITA, Koji[1], NAGAI, Hiroto[1], TANIGUCHI, Keisuke[1], TSUTAKI, Shun[1], OKAMOTO, Sachiko[1], HOSHINA, Yu[1]

[1]Nagoya University

Shrinkage of mountain glaciers associated with recent global warming are observed in many part of the world. Its influence on scarce water resources and sea level rising is one of key issue in environmental studies. Both horizontal and altitudinal distribution of glaciers are inevitable for estimating glacial variation. However, previous database of glaciers (e.g. GLIMS, WGMS) include only spatial extent and statistic summary of elevation. Therefore, estimation of glacier variation based on such a database assumed altitudinal distribution of glacier. And it caused large error in the result. In this project (Glacier Area Mapping for Discharging in Asian Mountains: GAMDAM, Feb. 2011–Mar. 2014), we develop database of glacial distribution with elevation information for evaluating glacier contribution to discharge.

Although many of studies tried automation of glacier mapping, automation of debris-covered glacier, main type of glaciers in Himalayas, is still challenging task. Therefore, we digitized glacier extent manually. For digitization, Landsat ETM+ SLC-on (1999-2003) are used mainly. In the case of poor-quality Landsat image due to cloud or seasonal snow, ASTER Level 3A used as alternative image. Elevation information are derived from CGIAR-CSI SRTM version 4.1. In this presentation, we introduce about the scheme of glacier digitization and the progress of glacier database development.

Keywords: glacier, Asia, Area, DEM, database, remote sensing

Vegetation change and its causal analyses since 2000 in Inner Mongolia

BUHE, BAOYIN[1]*

[1]Buhebaoyin, [2]Hokutoh Morino, [3]Akihiko Kondoh

1.Introduction

Recently, MODIS and GIMMS NDVI data sets were created and published, which enable to capture vegetation changes with high accuracy than previous NDVI data set such as PAL(Rusmus,2007), and analysis of vegetation changes until recently. Especially in arid and semi-arid China, it is thought that there was a big change of land-use by the policies concerning anti-desertification activities since 2000. Also, a response of vegetation by the climate change such as global warming and land-use change resulted from the policies, are different in the region(Erideni,2009), so it is important to evaluate the "land vulnerability" in a region with the latest data set in making the future land-use plans.

The purpose of this study is to analyze vegetation change and its factor with MODIS and GIMMS data sets in the Inner Mongolia, China, where the desertification is the most serious concern.

2. Results and discussion

A spatial distribution pattern of vegetation change according to NDVImax (Holben,1982) from 2002 to 2010 is obtained showing a clear spatial differentiation. Especially in the mostly steppe region in Inner Mongolia, a decreasing vegetation trend including significant decrease is extracted, but in some regions in steppe, such as Horchin, an increasing vegetation trend including significant increase is extracted.

We also explored the relationship between vegetation change trends and climatic and anthropogenic factors. The relation between vegetation and climate factors such as precipitation and Warms Index(Kira,1945) in the Inner Mongolia showed link with the ecosystem. But in the Horchin, there is no link between vegetation and climate factor. So it is suggested that anthropogenic factor influence vegetation change in Horchin. Next, we explored the anthropogenic factor of the vegetation change in Horchin to use statistics data with GIS. As a result of the analysis, the area of vegetation increase in Horchin is linked with developed cultivated areas. And the vegetation decrease in steppe of Horchin is linked with grazing intensity especially in Horchin sand area. This study indicated that the vegetation change from 2002 to 2010 in mostly Horchin of Inner Mongolia is affected by human activity.

Keywords: Inner Monglia, since 2000, vegetation change, causal analyses, MODIS, GIS

Relationship between LiDAR data and height and density of trees in Izumozaki district, Niigata prefecture

OKATANI, Takaki[1*], Kousei Otoi[1], NAKANO, Takayuki[1], KOARAI, Mamoru[1]

[1]GSI of Japan

Hazard like landslide is suspected to be affected by land cover besides landform and geology from previous studies.

LIDAR survey measures length from aircraft to the surface of the earth by traveling time of laser between transmission and reception. The survey can also obtain values relating to height and density of trees. Recently, dense observations having been performed in Japan.

This study verifies relationship between LIDAR data and height and density of trees in Izumozaki district in Niigata prefecture, aiming at establishing new land cover classification method involving information of height and density of trees as the information is thought to contribute to evaluation of possibility of occurrence of landslide hazards and to be calculated by LIDAR data.

The study showed that estimated tree height by subtracting DTM from DSM is approximately consistent with actual tree height and density of trees might be estimated from distribution of differences between DSM and DTM as the small differences are often observed in sparse area.

By the way, LIDAR data were affected by type of trees as the data were obtained in late October to early November. In that season, DSM random point data were seen near the surface of the earth in magnolia trees and Prunus sargentii trees area as these trees lost leaves earlier than other deciduous broad-leaf trees such as Quercus serrata trees and chestnut trees. This shows that LIDAR data are strongly affected by degree of loss of leaves, and understanding of the degree of loss by aerial photos or other sources is very important when assuming density of trees from LIDAR data.

Keywords: LIDAR Data, Height and Density of Trees, Izumozaki District
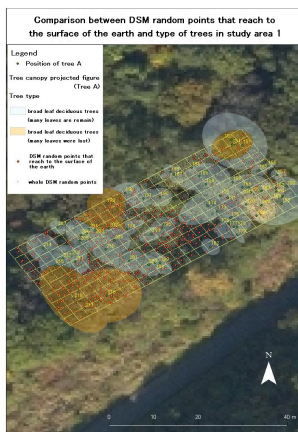
A study of land use category for application of survival time analysis: Differences between forestland and wasteland

MIZUTANI, Chiaki[1]*

[1]Division of SIS, Univ. of Tsukuba

In many cases, forestland changed to other land uses during land use transition such as expansion of farmland and urbanization. For this reason, forestland is one of the significant land use categories to grasp the land use transition. While, the popular land use data sets which are named as "detailed digital information (10 m grid land use)" and "digital map 5000 (land use)" aggregated the "forestland and wasteland" as one category. This category includes forestland and the others. There is no guarantee this category might have any impact on the analyzed of land use transition including forestland. This study aims to investigate the impact on the land use category which is "forestland and wasteland" for survival time analysis of land use.

The land use data set which has forestland and wasteland as individual categories are used. The used data set follows the land use classification of digital map 5000 (land use) which is published by Geospatial Information Authority of Japan and additionally classified more details about "forestland and wasteland" using referencing data.

The impact of the aggregation and disaggregation of forestland and wasteland is analyzed using the land use data set. Temporal aspect of each category is analyzed through the application of survival analysis. To analyze survival time of each category means to evaluate the survival probability for land use categories. The expected results will show whether the category has the similar trend or not. As a study area, the Central area of Tsukuba City is selected and the study period is from 2000 to 2007. Farmland has the largest aerial share through the study period, and residential land and road are the second and the third order.

Results show temporal changes of forestland and wasteland in area from 2000 to 2009. Forestland decreased from 85 ha to 60 ha. 10 ha of forestland decreased from 2003 to 2004 and the after forestland decreased gradually. Area of wasteland also decreased from 15 ha to 10 ha. But the area of wasteland increased a few from 2003 to 2005. Then after, it went to back to decrease trend. In addition, aggregated area of forestland and wasted land are analyzed. As a result, the ratio of forest and wasted land is eight to one. Because forestland has the larger than the wasteland, the impact is small using aggregated "forestland and wasteland".

Based on the above initial analysis, survival analysis is applied to for each forestland and wasteland individually. And the impact of the aggregation and disaggregation is discussed.

Keywords: land use category, lifetime, survival time analysis, forestland, wasteland

Land use/ cover change by human impacts using time series of geographic information

KOARAI, Mamoru[1]*, MIZUTANI, Chiaki[2], NAKANO, Takayuki[1]

[1]Geospatical Information Authority of Japan, [2]University of Tsukuba

The study aims to analyze human impacts on land use/ cover change using enriched time series geographical datasets. Two study areas are selected. The one is Tsukuba City and the other is Miura Peninsula. Both areas have experienced big land use/ cover changes by construction of rail system.

In Tsukuba City, land use changed area located along the Tsukuba Express (TX) railroad line, which was opened in 2005, were analyzed using the annual time series of land use data from 2000 to 2009. The land use changed area after 2003 is large, because of rapid developments just before the opening of TX railroad. About the contents of land use changes in the buffer nearby railroad line and station, development ground is dominant for land use after change between 2003 and 2004 and before change between 2008 and 2009, and various land uses such as residential area, commercial area and road area are dominant for land use after change between 2008 and 2009. On the other hand, the peak of land use changes area is after 2008 about the buffer far from railroad line and station. The change between 2008 and 2009 can read the tendency that rate of developing ground after change being larger than the buffer near railroad line and station.

Frequency of land use change is analyzed to clarify the geographical condition of the land use change. We found that approximately 30 percent of the study area changed the land use for the study period. The maximum frequency of land use change is six times in each land use polygon during the study period. As a result, when the frequency of land use change is low, the adjacent polygons have low frequency of land use change. At the same time, when the frequency of land use change is high, the adjacent polygons have high frequency of land use change. Those indicate that the polygon with frequent changes of land use is located in an area of frequently changed land use. Additionally, those suggest the existence of a place which can change the land use easily.

In Miura Peninsula, the railroad opened in the Meiji period. We compared the vegetation data in early Meiji period produced using "Jinsoku-sokuzu" map and the actual vegetation map data in 2000 published by the Ministry of Environment. Although scrub forest decreased conspicuously in whole Miura Peninsula, secondary forest and natural forest were left behind 20% even in 2000. The area ratio of scrub forest, secondary forest and natural forest decreased remarkably in Tokyo Bay side, especially decreasing from about 50% to about 10% at the northern Yokosuka basin. At Zushi coast basin and Odawa bay basin on Sagami Bay side, the area ratio of secondary forest and natural forest in 2000 remains in about 35-40% from the early Meiji period. The unified secondary forest and natural forest are left at Morito River origin area in Zushi coast basin and Koajiro Bay coast in Miura City south basin in the 2000s. The difference of the human impact such as existence of railroads can also regard the big difference between Tokyo Bay side and Sagami Bay side as one of factors.

Keywords: time series of geographic information, human impact, land use change, Tsukuba City, Tsukuba Express, Miura Peninsula

HTT29-06   Room:102A   Time:May 22 15:00-15:15

# An investigation of common sense about land use in Japan

HANASHIMA, Yuki[1]*

[1]Div. of Spatial Information Science, Univ. of Tsukuba

Recently, advancements of the remote sensing technology have triggered prevalence of diverse geographic information. Because the geographic information is, however, produced along each purpose of production, their data format or content would not be consistent with each other. The developments of spatial data infrastructure which manage and use such geographic information have been address by study field of GIS. Ontology has been known as a one of the approach of critical contribution to establishment of semantic interoperability between such geographic information. Since each culture has its own culture-specific common sense beliefs pertaining to own environment and circumstance, the ontologies to be developed in different culture should be different. However, because this kind of common sense would include perceptions and cognitions in everyday and non-scientific folk theory which is shared among people in a community, a methodology to develop culture-specific ontologies have not been proposed.

In this study, the common sense about land use category in Japanese community were investigated by the questionnaire which was carried out for 60 graduate and undergraduate student majoring in earth science and the evaluation of accuracy about determining land use category in land use data which is *Detailed Digital Information (10m Grid Land Use).* The questionnaire is contents which make 38 facility classes submitted to classify into four classes, *Public facility, Commercial facility, Residence,* and *Others,* and is intended to investigate the common sense of land use category among these students. On the other hand, the accuracy about determining land use category using land use data produced by land use interpretation by human beings was evaluated, the common sense about land use category among interpreters were investigated. The facility classes which are in common in the two investigations were extracted, both of results were compared. The facility classes which scored relative high in both investigations are *Library, Fire department,* and *Public school* etc. (Fig.) and would be central members of *Public facility* land use category in common sense of Japanese community. Similarly, the facility classes which scored relative low in both investigations are *Welfare house for aged,* and *Vocational school,* etc. (Fig.) and would be peripheral members.

This study pointed out the distinctions and characteristics of common sense about land use categories in Japanese community, would contribute the development of spatial data infrastructure in Japan. Also, it can be considered to contribute the comparison between Japanese land use data and the other countries data. Moreover, in order to develop worldwide spatial data infrastructure, it is necessary to investigate this kind of common sense in various culture or linguistic community.

Keywords: land use cognition, land use determination, ontologies
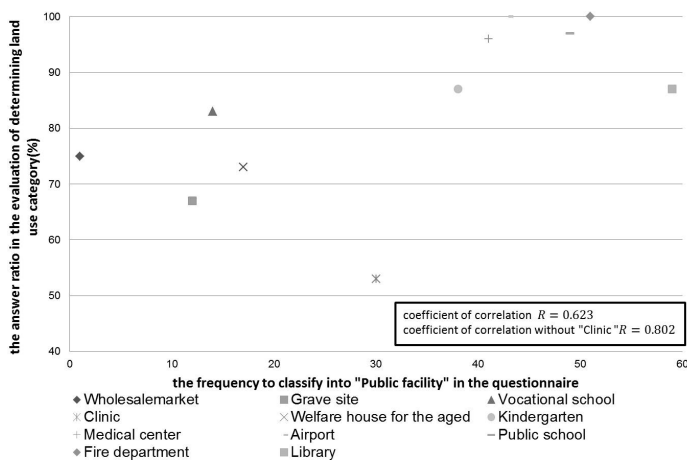
Rediscovering landscape in modern Osaka

NAKAJIMA, Toshisuke[1]*, YOSHIKAWA, Shin[2], Kazunari Tanaka[2]

[1]Graduate School of Eng.,OIT, [2]Faculty of Eng.,OIT

Osaka is redeveloping itself as a cultural area for tourists. It is important how tourists can see and can approach these cultural areas. This study aims to develop good points of view around its cultural areas. In conventional analysis, the objects are considered. In this study, the relation between the object and view point is analyzed.

Firstly, by the image analysis which utilizes photographs, typical view is grasped. Next, I the authors try to found the best view, and to defined new landscapes. GIS is a practical method for this analysis. By the analysis for picture-community site in internet where multiple users can access images. The typical landscapes can be defined using these pictures. The Glico-neon area and Tutenkaku area are found as one of the most common viewed areas in Osaka.

Secondly, to define the view point in the areas, Visibility Analysis was done. The numerical value of the points cleared The park and Midosuji, areas are the best Glico-neon area and Tutenkaku area are seen from a lot of points in distances. The Angle Elevation Analysis was adapted using Martens Law, to find the best view point. The object places were evaluated by matching the result with Visibility analysis. The results of analysis were verified to use landscape simulations three-dimensional models.

In this study, the delegable landscape in modern Osaka was defined.

In addition, it is clear that the most common landscape and the vest view point for Glico-neon and Tutenkaku

Keywords: landscape, picture-community site

HTT29-08   Room:102A   Time:May 22 15:45-16:00

Restoration of Urban Landscape in Early Modern Naniwa-city Based on Deciphering Historical Pictures

ISHIDA, Keita[1]*, YOSHIKAWA, Shin[2], Kazunari Tanaka[2]

[1]Fukken Co., Ltd., [2]Faculty of Eng.,OIT

Japanese infrastructure was constructed by the large-scale urban developments both, in the post-war reconstruction period (1945-1954) and in the high economic growth period (1955-1972). Landscapes of nature and of the history have been lost while convenient cityscapes were formed by the urban developments. For this problem, a law was established to support urban design to make use of local culture and history. On the other hand, landscape simulations have been becoming easy-to-use for persons concerned by evolution of geo-spatial information technology. Moreover, the scheme of the beautiful country creation policy summarized in 2003 has the main object which changed landscape are compared analyzed by simulations using the Geographic Information System.

It is important to design of conservation or preservation in contemporary cities. Therefore, analyzing from the viewpoint for landscape about the historical cityscape is necessary. Naniwa city is the old name of Osaka city in Kinki area in early modern time in Japan. It is one of the big three cities. It has a lot of cultural materials. In this study, the authors analyze the sights in the historical pictures painting Naniwa city. The three-dimensional models are simulated to analyze the landscapes of some parts of the Naniwa city.

A terrain model is important for urban landscape simulation. After experiencing these process, the old terrain model, which is of early modern Japan, was created from present digital elevation model (DEM) data, which was added correction of the historical records. The old terrain model was assembled allowing the movement of coastline and an amount of grand subsidence. The sights in Naniwa were identified by hotspot analysis based on historical pictures with geocoding. Old main roads were put on the map in the same way. By the analysis of the location, a area restored was chosen the Shitennoji temple area beside old main road. In a landscape simulation by using a three-dimensional urban model, huge data volume always becomes a problem. Therefore, the model of Naniwa was made by the technical skills of landscape engineering a field of vision, a view points, levels and so on. The authors classified the levels to create three-dimensional model which control the data volume. The authors made three pictures. First was the picture written by Sadanobu Hasegawa in Naniwa Hyakkei pictures. In this picture, it is cleared that the relation between the place of mountain and tower are different of real space. Second picture is by Utagawa. It is compared with the contemporary space.Third is the tower and the Shitennoji temple in the foregraund.

The analysis between in Naniwa City is simulated by the using geo-information technologies. In this study, the landscape of Naniwa was clear using landscape simulation by three-dimensional urban models. The landscape transition was understood by landscape simulation from the same viewpoint. The authors continue landscape restoration because it was not sufficient landscapes of Naniwa.

Keywords: historical picture, restoration, geo-information technology

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Development of Web-GIS in Order to Accumulate, Share and Exchange Regional Knowledge

Hiroki Nakahara[1], YAMADA, Syuji[1]*, Takehiro Okuma[1], YAMAMOTO, Kayoko[1]

[1]Graduate School of Information Systems, University of Electro-Communications

The Science Council of Japan's 2008 "Towards the Accumulation and Utilization of 'Regional Knowledge'" places heavy importance on locally inherent regional knowledge, and considers systemic reforms targeting the accumulation, organization, utilization, and release of this regional knowledge, together with technological development, and the establishment of a system for operating the above, to be essential. "Regional knowledge" is information, knowledge, and wisdom that combines "specialized knowledge", highly specialized data resulting from scientific knowledge, with "experiential knowledge", which is a product of the experiences of the people living in an area. It permeates the daily lives of people living in a region. It is now possible for people to easily exchange information with others anytime, anywhere, and with anyone, through the use of information systems. Effectively used, information systems can make it possible to share regional knowledge even more efficiently.

Against this backdrop, the importance of information systems which can share regional knowledge, which is "implicit knowledge", the domain of local residents, left un-visualized, not having been conveyed to others, in the form of "formal knowledge", which can be stored, organized, utilized, and publicized, will continue to grow. The objective of this study is the development of an information sharing GIS, specially tailored to the efficient accumulation, sharing and exchange of regional knowledge within regions on the city, town, and village spatial scale.

The information sharing GIS of this study is a geographical information system which integrates a Web-GIS, an SNS (Social Networking System), and a Wiki into a single system. These three Web applications have the following features.

- Web-GIS: This makes it possible to geographically understand positional information, manage massive amounts of position based data, as well as display analysis results involving environmental variables.

- SNS: These are suited for the sharing of information between users connected by some commonality. Because users can be individually identified, SNS can be used in the creation of environments which are close to the real world.

- Wiki: With wikis, it is possible for multiple users to modify and update the same Web page. Users cooperate together to create and refine content, improving it over time.

Integrating the three Web applications described above makes it possible for SNS to be used to narrow down the user base to target users, for Web-GIS to be used to visualize actual target regions, and for wikis to be used to share information specific to individual locations, creating a synergistic effect capitalizing on each of their strengths. Our study is unique in that it regards the development of an information sharing GIS which integrates these three Web applications.

The information sharing GIS which is the topic of this study uses a design which ameliorates the following three constraints such as time constraints, spatial constraints and continuous operation related constraints, making it possible to design systems in accordance with target cases. This shows the utility of the system designed during the course of this study.

Keywords: Rgional knowledge, Information Sharing GIS, Web-GIS, SNS, Wiki

Construction and Practical Use of Campus GIS

SU, lei[1]*, SUGINO, Hiroaki[1], HASHIMOTO, Misao[1], MURAYAMA, Yuji[1]

[1]Division of SIS,Univ. of Tsukuba

To improve eco-friendly campus environment in University of Tsukuba,CampusGIS for University of Tsukuba was constructed as a digital map platform. This WebGIS includes the data the university manages and the data obtained by field survey unitary. And the service had been uploaded.Using this service, every office section, the students, and the neighbors of the university are possible to sharing of the problem information on a campus and possible to analyzing some spatial causes of the problems.

Keywords: Campus, Living environment, WebGIS, Field survey, Data sharing

On influence of the train stations on urban space

NOMADA, kyohei[1]*, Kazunari Tanaka[2], YOSHIKAWA, Shin[2]

[1]Comprehensive Construction Consultant. OHBA CO,LTD, [2]Faculty of Eng.,OIT

Recently Stations have improved and are seen as landmarks of a city. Moreover, city planners understand the influence a station can have on the image of a city.

In my study, I research the impact of train station on its surrounding environment. I also study how a train station is perceived by people.

In Japan, a train station generally refers to the station and the area surrounding it. Thus, the station is not only seen as a platform with tracks but an area that extends beyond the station also.

Actually, the area of a train station can vary from station to station-front store. Others may have small parking areas or parks near them. So, city planners are changing the definition and mapping of a train station to include the range of stores, parking areas, park etc.

Station is not only the landmark that consists the image of the area surrounding station, but also has a great influence on urban structure. This study is conducted by statistically analyzing information on the station space. Moreover, it has aims to extract understand of the station and the station by extracting the influence element of the station reflected in the urban and to compare and to analyze it between each object stations. By the geo-spatial information technology, the connections of the space around station and on urban structure that centered on the station are clearly found.

Keywords: station, urban, influence