Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-01 Room:201A Time:May 25 08:30-08:45

Multi dimensional modeling of geoinformation and the standardization

Ryoichi Kouda[1*]

[1]National Institute of Advanced Industria

Geoinformation is composed of various data related to the planet earth. In the information science, the former style to treat geoinformation was to use the projected plan view model from multi dimensional data, while today and future style uses multi dimensional data effectively with the advanced information tools of hardware and software. In the two dimensionally projected models, three dimensional data can be modelized with the international standard of OGC and GeoSciML based on GIS. Multi dimensional model over three can be treated the technological trend of the recent information processing. In two dimensinally projected system, the international standard like OGC and GeoSciML models together with free and open source software(FOSS) like GRASS-GIS and so on can handle three dimensional geoinformation with the accessible maps of digital geology and substantial database systems. Three dimensional modeling can popularly be treated by simulation models like finite element modeling. The three dimensional subsurface modeling is well known in the expensive software system of petroleum and mining or independent tools but they are not much popularized. The reason of the difficulty can be considered by the underdevelopment of the international standards as well as of the three dimensional subsurface data and metadata, though they are recently improved. In order to popularize and to standardize the three dimensional subsurface modeling, it is suggested to establish the international standards of multi dimensional geoinformation, to disclose more subsurface database systems adopted to the standard, and to open testbeds of representative source data of subsurface to encourage to develop FOSS based modeling systems.

Keywords: geoinformation, three dimensional subsurface modeling, database, three dimensional metadata, international standard

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-02 Room:201A Time:May 25 08:45-09:00

International geoinformation managements

Ryoichi Kouda[1*]

[1]AIST

Geoinformation managements shows to cooperate to cross borders with interdisciplinary fields. The service providing business is promoting new trend of dissemination of information and managements in the world geological organizations and companies. The recent trends are reviewed.

Keywords: interoperability, international standards, One Geology

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-03 Room:201A Time:May 25 09:00-09:15

The publication of the digital geological maps of Japan 1:200,000 with JIS A 0205 subject attribute codes

Yoshiharu Nishioka[1*], Kazuhiko Kano[1], Toshimitsu Iwaya[1], Annie Yoshie Nonogaki (Masaka)[1]

[1]Geological Survey of Japan ,AIST

To promote the circulation of geological information, JIS A 0205:2008(Japanese Industrial Standard, Vector-digital geological-map – Quality requirements and subject attribute codes) systematized symbols, patterns and terms in geological maps, and gave code to them. On the revision of ”Digital Geological Maps of Japan 1:200,000, North Hokkaido” and ”Digital Geological Maps of Japan 1:200,000, South Hokkaido”, we applied JIS A 0205 codes to geological legend. Furthermore, for convenience of the user, we made KML files, which were one of the latest OGC standards, and bundled in our CD-ROM.

Keywords: Standardization, KML, code, JIS, geology

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-04 Room:201A Time:May 25 09:15-09:30

A proposal for a recommended standard format for geophysical data for civil engineering applications

Toru Takahashi[1*], Tomio Inazaki[2], Toshiyuki Kurahashi[2], SEGJ Digital Standard Format Consortium[3]

[1]Fukada Geological Institute, [2]PWRI Tsukuba Central Institute, [3]SEGJ

Information of subsurface structure and physical properties should be opened as an important and fundamental land data of the nation. As one of the major land data, the boring log data obtained in many locations in Japan have been stored into a database as a XML-type digital data. The physical properties of soils and rocks measured with the laboratory test of boring core samples have been also stored into the same database.

On the other hand, although the standard data format such as SEGY and SEG2 for seismic reflection data has been widely used, those for other geophysical methods such as the electrical method and surface wave method have not been standardized yet, which prevents effective use of geophysical data in many civil engineering applications.

Therefore the Society of Exploration Geophysicists of Japan (SEGJ) organized a research consortium for establishing the standard digital format of geophysical data, in corporation with the Public Work Research Institute (PWRI) who has already established and opened a geotechnical database KuniJiban. The consortium is now studying the standard digital formats of the data and two-dimensional sections, preferentially for the seismic refraction method, surface wave method and electrical method which are often employed in civil engineering applications. The digital data format is the XML-type and that for the two-dimensional section is represented in cell or grid-based. The standardized data will be opened as a trial version on the website of PWRI in the near future.

Keywords: geophysics, civil engineering, digital standard format

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-05 Room:201A Time:May 25 09:30-09:45

Mineral resources database of East Asia area

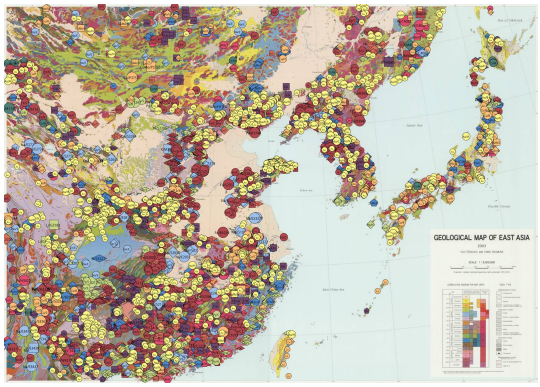
Tetsuji Ohno[1]*, Masaharu KAMITANI[1], Kimio OKUMURA[1], Yoji TERAOKA[1], Sumiko Miyano[1], Yasusi WATANABE[1]

[1]AIST

The mineral resources map of East Asia (Kamitani et al., 2007) shows land area deposits of main metallic mineral and non-metallic mineral resources, except for construction materials. About 3,200 mineral deposits are shown on the map regardless of their status of exploration, exploitation and mined out.

The background geology of the Mineral Resources Map was adopted from the Geological Map of East Asia (Teraoka et al., 2003).

All deposit data are published as Excel file format. However, anyone is said to want a more accessible file formats. Therefore, we are considering publishing data by other forms such as svg or pdf.



Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-06 Room:201A Time:May 25 09:45-10:00

Standard and Metadata Management in GEO Grid

Isao Kojima[1*], Akiyoshi Matono[1]

[1]ITRI, AIST

GEO Grid(http://www.geogrid.org) is a R&D program in AIST, which aims to provide a distributed e-science infrastructure based on the Grid/Cloud technologies. The feature of the GEO Grid is as follows.

1) Grid/Cloud based distributed infrastructure which supports data and computing federation. Using the Grid techinology, it is achieved to support safe database federation among distributed organizations.

2) Support OGC(open geospatial consortium,http://www.opengeospatial.org) standards which provides web-based access interface for the metadata search(Catalog Service Web, CSW), map access(Web Map Service, WMS) and data processing services(Web Processing Service, WPS).

3) Various application services with original contents are provided. Examples includes fast 3D DEM(digital elevation model) service and earthquake estimation service.

Metadata management is an important functionality for our GEO Grid since it provides distributed resource discovery and management. Achieving efficient metadata management requires handling a large amount of metadata with heterogeneous profiles/schema in an integrated manner. Moreover, these metadata are generally created in a distributed environment, necessitating distributed metadata management.

For this purpose, we have developed a distributed metadata management system called AIST-CSW, which is based on data-type search indices. These indices are constructed for various data types, including full texts, and are extensible for new user-defined data types. Using this system, we can provide schema-based form queries while supporting schema-free full-text searches. We have also designed a standard HTTP-based access protocol including several domain-specific access standards, including an OGC catalog service and Open Archive Initiatives. In addition to search functionalities, we provide both data harvesting and data registration for the collection of metadata.

Keywords: Earth Observation, Metadata, OGC Standards, GEO Grid

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-07 Room:201A Time:May 25 10:00-10:15

Integration of Borehole Information Databases using Meta Data

Masahiro Ooi[1*], Katsumi Kimura[2], Tatsuya Nemoto[2], Hiroyuki Fujiwara[1]

[1]NIED, [2]AIST

In the past years, a great number of underground structure surveys were conducted nationwide for various purposes. The data collected through the surveys, however, had seen limited use in comparison to its full potential, with some of them now kept in dead storage and at risk of being lost. At present, Japan does not have a comprehensive, national database of underground structures. It is therefore very important to ensure these data are not lost while also making them accessible to anyone through the construction of a database.

Since the underground structure information and geological information were acquired through surveys conducted for various purposes, these data are scattered across ministries, local governments and relevant organizations. To integrate the data and make it more usable, cooperation of these relevant entities is indispensable.

We have been developing a management system on sharing for an integrated geophysical and geological information database to support researches on earthquake disaster mitigation. The database consists of borehole information, geological data, geophysical data, and surface soil structures. Our target is to use the database on computer network. People can access the data sets on the underground database by using web browser like Internet Explorer. The management database system is based on the concept of establishing a portal site for individual agency to be responsible for its own data.

This research was supported by the special coordination funds for promoting science and technology of 'Development of an integrated geophysical and geological information database'.

Keywords: underground structure, database, borehole data, management on sharing, open source, portal site

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-08 Room:201A Time:May 25 10:15-10:30

Establishment of ”Marine Information Clearing House” in Japan

Hiroyuki YORITAKA[1], Yoshiharu NAGAYA[1], Hiroyasu FURUKAWA[1], Akihiro SETA[1], Tadashi Ishikawa[1*]

[1]JHOD

The Japan Oceanographic Data Center (JODC) started to operate ”Marine Information Clearing House” manages and provides metadata of marine data and information in March 2010.

In Japan, the Basic Act on Ocean Policy was put into force in July 2007 aiming comprehensive and systematical promotion of ocean policies to realize the sound development of economic society and the more stable life of Japanese people as well as to contribute to the coexistence of human beings. In order to promote measures with regard to the oceans intensively and comprehensively, Headquarters for Ocean Policy was established in the Cabinet. Director-General of the Headquarters is served by the Prime Minister. The Headquarters formulated the Basic Plan on Ocean Policy on 18 March 2008.

In the Basic Plan on Ocean Policy, it has been requested to establish a system to comprehensively manage and provide the data and information now scattered in respective agencies, so as to provide them for private companies and research institutions in a user-friendly manner and enhance effectiveness of marine surveys by respective agencies, with a view to contributing to the development of marine industries and the improvement of scientific knowledge.

It has also been requested that, in the process, efforts made so far by agencies such as JODC, which has carried out international services under the framework of International Oceanographic Data and Information Exchange (IODE) promoted by Intergovernmental Oceanographic Commission (IOC) of UNESCO, should be utilized at a maximum to make the system effective and efficient, while seeking cooperation from universities, local governments and private companies as well. It should be ensured that collected and managed information is accumulated comprehensively over a long period of time.

Under the framework of the Basic Plan on Ocean Policy, a task team was organized and decided to develop ”Marine Information Clearing House” in JODC. The system manages and provides metadata of marine data and information scattered in each agency. The metadata of the system contains attribute information of the marine data or information, such as title, summary, contact, time scale, special scale and etc, so that users could easily find necessary data or information through the system.

A format of the metadata was developed based on Japan Metadata Profile (JMP) 2.0 which was formulated by Geographic Survey Institute in Japan in compliance with ISO 19115 metadata standard. The task team decided to cover a variety of categories for the information managed in the system, such as ocean physics, ocean chemistry, marine environment, marine biology/ecosystem, marine meteorology, topography, geophysics, geology, energy, mineral resources, geographic boundaries, marine spatial information, disaster prevention information etc. The system covers not only scientific data but also social information that for the user, such as marine research cruises and facility information, publications and the legislations concerned. User friendly interface and functions have been considered in the system providing synonyms dictionaries, pill-down menu or retrieval function on map etc.

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-09 Room:201A Time:May 25 10:45-11:00

Global Data System for Multi-Dimensional Diverse Data

Toshihiko Iyemori[1*], Hiroo Hayashi[3], Takashi Watanabe[2], Yukinobu Koyama[1], Daiki Yoshida[1]

[1]Graduate School of Science, Kyoto Univ., [2]STE Laboratory, Nagoya Univ., [3]Research Institute for Sustainable Human

Interdisciplinary research is a trend of recent geosciences. However, when a researcher starts a new research with the data in other discipline, unnecessary efforts such as duplicate observation might be done, or he might give up. A metadata system which covers wide area in geosciences is necessary. In this paper, a new global system, the ICSU World Data System (WDS), and a new inter-university program (IUGONET) are introduced as the examples of the data system for Multi-Dimensional Diverse Data.

Keywords: World Data System, Inter-university program, interdisciplinary, diversity, multi-dimensional, metadata

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-P01 Room:Convention Hall Time:May 25 16:15-18:45

Surface Interpolation System for Geologic Data on the Web

Susumu Nonogaki[1*], Tatsuya Nemoto[1], Shinji Masumoto[2]

[1]GSJ, AIST, [2]Geosci.,Osaka City Univ.

Geologic data observed in the field survey are often distributed irregularly. One of the effective way to interpret these data objectively is a contour map generation with a certain interpolation method.

We developed a prototype of surface interpolation system for geologic data. The system enables us to determine an optimal surface for a given set of geologic data on the Web. Two kinds of filed survey data are available. One is elevation data and the other is strike-dip data. The optimal geologic surface is determined based on smoothing algorithm with bi-cubic B-spline.

The procedures for surface interpolation are as follows: 1) upload field survey data, 2) generate distribution map of uploaded data, 3) determine the optimal geologic surface and 4) generate the contour map for the optimal surface. There are three kinds of output data: 1) mathematical function that represents the optimal geologic surface, 2) evaluation parameters for smoothness of the surface and goodness of fit and 3) mesh data with arbitrary size of grids.

This system must promote effective use of geologic data on the Web. In this presentation, we will explain the detail of the system.

Keywords: Geologic Data, Interpolation, Web, Bi-cubic B-spline, Contour map

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-P02 Room:Convention Hall Time:May 25 16:15-18:45

WEB system for standardization of geographical information on coastal area

Yumi Amemiya[1*], Toshiaki Ueki[1], Ryoichi Kouda[2]

[1]OHTI, [2]AIST

WEB system for standardization and management of geographic information on littoral regions

The littoral region is an important area for economy and people's life, because big cities and many factories locate in the land area, and important harbors and fishery facilities locate in the sea area. So far the exploration tool of the geographic information is different in the sea area and the land area, and in the littoral area, as the condition is limited further, there is a necessity for attempting the data integration of land area and the sea area, such as combining the reflection method by bay cable, the electric detection method and gravity/magnetism data.

This research improves the interoperability of the geographic information of the littoral area now open to the public by two or more organizations who are in charge of managing this information, and also contributes to the efficiency improvement of the analysis and the overall use and management, by integrating and standardizing the geographic information of the land area and the sea area.

To integrate and to analyze the geographic information data of the land area and the sea area that had been collected by two or more different organizations, a new system is constructed for unitary management of the meta data of different organizations by a standard format, and opening to the public by WEB base. Standardization at the meta data level can contribute also to the efficiency improvement of the retrieval, use, and management of data, for the integration and unitary management of different kinds of data.

Keywords: coastal area, geographical information, standardization

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-P03 Room:Convention Hall Time:May 25 16:15-18:45

1:3,000,000 THE MINERAL RESOURCES OF CENTRAL ASIA AND ADJOINING AREAS

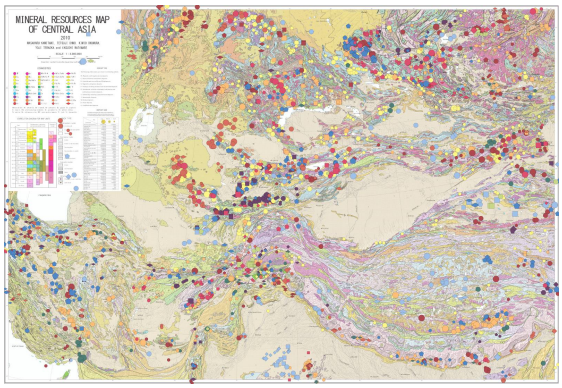
Masaharu KAMITANI[1], Tetsuji Ohno[1*], Kimio OKUMURA[1], Yoji TERAOKA[1], Yasusi WATANABE[1]

[1]AIST

The mineral resources map of Central Asia is adjoins the mineral resources map of East Asia published in 2007 and includes the Central Asian and part of the neighboring countries.

The map of Central Asia shows land area deposits of main metallic mineral and non-metallic mineral resources, except for limestone, dolomite, magnesite and construction materials. Uranium is included, although its principal utilization is for nuclear energy. About 2,700 mineral deposits are shown on the map regardless of their status of exploration, exploitation and mined out.

The background geology of the Mineral Resources Map was adopted from the Geological Map of Central Asia (1 to 3,000,000 scale; Teraoka and Okumura, 2007). The geology of the northeastern part of the map was newly added after the publication of the Geologic Map of Central Asia (Teraoka and Okumura, 2007) for this mineral resources map.



Keywords: mineral resources, Central Asia, metallic mineral, non-metallic mineral

Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

MGI030-P04 Room:Convention Hall Time:May 25 16:15-18:45

Collection and analysis of physical properties of rocks for enhancing the geotechnical database KuniJiban

Toru Takahashi[1], Tomio INAZAKI[2*]

[1]Fukada Geological Institute, [2]PWRI Tsukuba Central Institute

The geotechnical database KuniJiban of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) has more than 75,000 data of the boring logs and laboratory soil tests as of April 2010. However the laboratory test data registered in it are mainly those for unconsolidated soils, not many for rocks. Therefore we have started to collect and digitize the laboratory test data for rocks obtained in investigations for dams and tunnels conducted by MLIT in the past.

Before starting digitization of the data, we have studied the information and data to be registered referring to existing databases. Main physical properties of rocks decided to be registered include ultrasonic P- and S-wave velocities, and deformability and strength measured by uni-axial and tri-axial compression tests, as well as the basic physical properties such as density, water content, porosity and magnetic susceptibility of the rock. The information on the location and geology of the core sampling site is also registered. Approximately 1,600 data obtained mainly in investigations at the dam sites has been so far digitized.

To check the quality of each digital measurement data, major physical properties of P- and S-wave velocities, dynamic and static deformability, and unconfined compressive strength are cross-plotted against each other and also compared to other datasets. This check indicates that most digitized data are high in quality enough for further analysis.

Keywords: database, KuniJiban, phsyical properties of rocks, laboratory rock test