Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U01-01 Room:419 Time:May 1 09:00-09:15

International Activities of Science Council of Japan (TBD)

KASUGA, Fumiko[1*]

[1]Science Council of Japan

International activities of Science Council of Japan will be reviewed and discussed, including Future Earth, ICSU-WDS, and CODATA etc. (TBD)

Keywords: Future Earth, ICSU-WDS, GEOSS

Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U01-02 Room:419 Time:May 1 09:15-09:30

Global Data Framework and Japanese Contribution

MURAYAMA, Yasuhiro[1*]

[1]National Institute of Information and Communicatoins Technology

Open data is not only the subject discussed in the last G8 meeting 2013, but also can be a wide-spread argument and can become substantially important factor in conducting science. Of course we cannot make all the research data publicly open immediately after its creation. But also data and paper are important in the modern science scheme, for validating results of a scientific research, e.g., its reproduction or statistical significance particularly in fields such as physics, earth science, or so. Recently there are found scientific results in certain percentage of original papers which are not necessarily reproducible in life science fields. Today's society has increasingly big concern with climate change and huge earthquake etc., where scientific research may directly affect real worlds like political and people's decision making. Validation of scientific papers is important since it may affect mutual trust between science and society. Here electronic data which can be linked to scientific papers in data citation scheme, are part of evidence of our scientific truth. In comparison to the history for a couple of hundred year of the printing culture in scholarly communications, the modern technology like Internet, hard disk drives, etc., have only the tens-of-years history. Human beings are now challenging this new system of electronic way to conduct science with society, seeking the right strategy for management of scholarly information. International data management activity like ICSU-WDS from the academic side, and RDA related to governmental arrangement are part of such big challenges of the international community. Furthermore Future Earth, the international 10-year transdisciplinary research programme are promoted by ICSU, UN bodies, Belmont Forum, etc. for future of the planetary earth and human beings, where ICSU-WDS and CODATA are required to support Future Earth's international scientific data management. We need careful discussions to promote those activities, but with a bright hope for the human society who has the indispensable intellectual infrastructure called "science".

Keywords: Scientific data, World Data System, open data, data management, data science, geophysics

Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U01-03 Room:419 Time:May 1 09:30-09:45

The ICSU World Data System: Trusted Data Services for Global Science

EDMUNDS, Rorie[1*] ; MOKRANE, Mustapha[1]

[1]ICSU-World Data System International Programme Office

This presentation will give a brief overview of the current activities of the International Council for Science – World Data System (ICSU-WDS). In particular, it will focus on ICSU-WDS' close involvement in the new Future Earth initiative and the Belmont Forum e-Infrastructure Steering Committee. It will also highlight joint projects between ICSU-WDS and the Research Data Alliance.

Keywords: ICSU-WDS, trusted data, long-term preservation, interoperability

Japan Geoscience Union Meeting 2014
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U01-04 Room:419 Time:May 1 09:45-10:05

Issues and Agenda toward Data Era

IWATA, Shuichi[1*]

[1]MPD

Issues and agenda toward ”Data Era” will be dicsussed.

Keywords: Science Council of Japan, data, CODATA

Japan Geoscience Union Meeting 2014
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U01-05 Room:419 Time:May 1 10:05-10:25

Importance of Future Earth in Asia

YASUNARI, Tetsuzo[1*]

[1]Research Institute for Humanity and Nature

Future Earth (FE) has been launched as an international initiative to promote research for global sustainability by the international science and technology alliance with partnership of the International Council for Science (ICSU), the International Social Science Council (ISSC), the Belmont Forum of funding agencies, the United Nations Educational, Scientific, and Cultural Organization (UNESCO), the United Nations Environment Programme (UNEP), the United Nations University (UNU), and the World Meteorological Organization (WMO) as an observer (Future Earth, 2013). Future Earth will provide a single overarching structure for researchers, funders, service providers, and users, and integrates the existing Global Environmental Change (GEC) programmes. The GEC programmes have provided foci for several extensive international and multi-disciplinary networks of researchers investigating key human-environmental dynamics. Future Earth would develop a new generation network building on these. Future Earth proposes national and regional level committees, in addition to the regional nodes. The most essential issue for the overall FE activity towards global sustainability will be how to integrate efforts and activity of solving environmental problems and achieving sustainability for local to regional scales.

This paper introduces a strategic science plan for FE in Asia, which should be a guideline for implementing the overall FE activity in the whole of Asia, including a comprehensive archive of data in natural science as well humanity and social science fields.

Keywords: Global Environmental Change, Asia, Future Earth

Japan Geoscience Union Meeting 2014
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U01-06 Room:419 Time:May 1 10:25-10:45

Integrated Data System on Climate, Water and Disaster Risk Reduction

KOIKE, Toshio[1*]

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Increased water cycle variability impacts primarily through water, biological processes and human dimensions with implications for land use and societal development. It is critically important to recognize the fundamental linkages among water; land use, including deforestation; carbon cycle and ecosystem services; and food-, energy- and health- securities. By sharing coordinated, comprehensive and sustained water cycle and related Earth observations and information for sound decision making, we are now in developing effective interdisciplinary collaborations for working together based on coordinated and integrated efforts and subsequently to both mitigation and adaptation benefits at a river basin scale. Reducing disaster risk and building resilience to the climate change and variability is essential for establishment toward the final goal, the sustainable development of Earth societies and ecosystems.

Keywords: Earth Observation, Water Cycle, Climate Change, Disaster Risk Reduction, Data Integration

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U01-07 Room:419 Time:May 1 11:00-11:15

Synergetic approach of bottom-up/top-down studies on CO2 and CH4 emissions from biomass burning and rice paddy in East A

IMASU, Ryoichi[1] ; TAKEUCHI, Wataru[2] ; SEKIYAMA, Ayako[2] ; SAITOH, Naoko[3] ; MATSUMI, Yutaka[4*] ; KAWASAKI, Masahiro[4] ; HAYASHIDA, Sachiko[5] ; ONO, Akiko[5]

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There has been still a large discrepancy in estimations between bottom-up and top-down approaches for both CO_2 emissions from biomass burning and CH4 from rice paddy in East Asia. The purpose of this study is to update the emission inventory databases as to be more consistent between these two approaches through a synergetic usage of satellite data, ground-based remote sensing measurements, and in situ data. The most important parameter to estimate total CO_2 emissions from biomass burning is the biomass amount of the forests. In this study the amount is estimated based on the normalized vegetation index (NDVI) observed by satellites and, CO_2 emissions from burning area are estimated by multiplying the fire strength evaluated from hot spot data with some auxiliary data such as soil moisture and groundwater level. As for the top-down approach, CO_2 concentration data observed from space are useful for constraining the inverse analysis of CO_2 emission strength. The greenhouse gas observing satellite (GOSAT) dedicated to observe atmospheric CO_2 and CH_4 concentrations was launched in 2009 and has been operated for more than five years. The main band of its sensor can measure the columnar CO_2 concentration, however, it cannot be directly converted into the concentration near the surface. One of our attempts is to develop a retrieval method to estimate CO_2 concentration in the lower troposphere, particularly in the boundary layer, from a synergy of spectrum data in a wide spectral range covering from short wavelength infrared to the thermal infrared. In order to validate this method we have carried out CO_2 sonde observations around Tokyo city where GOSAT has been operated in a specific observation mode (targeting mode) to obtain sufficient number of data over this area. Based on the validated results, this method will be applied to analyze the data observed in biomass burning areas. One of our important targets is Kalimantan (Indonesia) where peat fire is the main CO_2 emission source. We started the ground-based measurement of columnar CO_2 concentration using an optical spectrum analyzer (OSA), and expect that these temporally continuous data would be effective for achieving the consistency between bottom-up and top-down approaches. Also started are observations of columnar CH_4 concentration using the same type of spectrometer in Sichuan basin (China) and Karnal (India) where are identified as the extremely high CH_4 concentration area based on the almost decadal record of observations by SCIAMACHY and GOSAT. It is expected that the synergetic analysis of data from satellite and ground-based measurements could contribute to make clear the cause of high concentration of CH_4 in these areas.

Keywords: carbon dioxide, methane, GOSAT, top down approach, bottom up approach, ground-based remote sensing

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U01-08 Room:419 Time:May 1 11:15-11:30

Estimation of Ecological Function based on Biodiversity and Ecosystem Information

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[1]Graduate School of Arts and Sciences, University of Tokyo

In the Green Network of Excellence (GRENE) - environmental information project, we are working on collecting biodiversity and ecosystem information, and developing methods to use them for evaluation. In the past three years, more than 500,000 plant distribution information and information of more than 10,000 localities of vegetation had been databaed, and now they become available for users. Based on those information, together with several kinds of environmental information and land use data, it is possible to estimate distribution probability of each plant species, and to estimate some ecosystem functions of the forests with higher accuracy by considering composition of tree species. Here, I will present some examples of estimation of ecological function in Japanese forests, such as forest biomass, CO2 FLUX, and amount of pollination services for crops by insects. I also discuss a way from those ecosystem function to estimating Ecosystem Services, which is a total benefits for us provided by biodiversity and ecosystems function.

Keywords: Biodiversity Informatics, Eco Informatics, Ecosystem Function, Ecosytem Services, IPBES

Japan Geoscience Union Meeting 2014
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U01-09 Room:419 Time:May 1 11:30-11:45

Environmental Monitoring of Soil contaminated by Radiocaesium in Iitate Village using FMS developed in GRENE project

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Most of radiocaesium released from Fukushima Daiichi nuclear power plant has been accumulated in the topsoil within 5 cm. For decontamination of the top soil, Japanese government (Ministry of Agriculture, Forestry and Fisheries) has authorized three methods: topsoil stripping method, puddling method, and plowing method to replace surface soil with subsoil. Among three methods, the topsoil stripping method is being carried out and a lot of flexible container bags containing contaminated topsoil are piled up in the paddy field. We have not yet found the final disposal site of the contaminated soil. For agricultural regeneration and early return village, it is urgent and important to find a feasible decontamination method that farmers can conduct by themselves. Therefore, we are challenging a field test that buried the contaminated soil in the ground by a combination of the topsoil stripping method and the plowing method in Iitate Village in Fukushima Prefecture. We named this method ”Madei-method” that means we treat contaminated soil carefully. Currently, we are monitoring the radiation level from the buried contaminated soil by using a soil radiation sensor combined to the Field Monitoring System (FMS) that we developed for agricultural use in GRENE project. At the moment, leakage of radiocaesium has not been confirmed from the buried contaminated soil despite rapid changes in ground water due to rainfall and irrigation to the paddy. In the presentation, I explain outline of the FMS we developed in GRENE project and would like to propose to build a useful soil radiation database in Fukushima as one of important global data.

Keywords: decontamination, radiation, soil, monitoring, database, GRENE project

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U01-10 Room:419 Time:May 1 11:45-12:00

Framework of Applications of Environmental Information for Realizing Resilient and Sustainable National Land Design

HAYASHI, Yoshitsugu[1*] ; KATO, Takaaki[2] ; SUZUKI, Yasuhiro[1] ; TANIKAWA, Hiroki[1] ; SATO, Shinji[3] ; SHIBASAKI, Ryosuke[4] ; TSUKAHARA, Kenichi[5] ; KATO, Hirokazu[1] ; KAWAZOE, Yoshiyuki[2] ; SHIBAHARA, Naoki[1] ; AKIYAMA, Yuki[6] ; KACHI, Noriyasu[5]

[1]Graduate School of Environmental Studies, Nagoya University, [2]Institute of Industrial Science, The University of Toyko, [3]Graduate School of Engineering, The University of Tokyo, [4]Center for Spatial Information Science, The University of Tokyo, [5]Faculty of Engineering, Kyushu University, [6]Earth Observation Data Integration and Fusion Research Initiative, The University of Tokyo

1. Introduction

This research project, GRENE-City, aims to construct a methodology to design and realize ”resilient and sustainable national land” with mitigation and adaptation measures against vulnerabilities of national land and society. This ”resilient” concept is derived from an understanding of ”natural providence”. The proposed system takes advantage of a broad range of information includes disaster risk caused by meteorological phenomena and others from DIAS (Data Integration and Analysis System) by the Earth Observation Data Integration and Fusion Research Initiative (EDITORIA), the University of Tokyo. As such the system will be developed as a ”Progressive Integrated Database” based on various environmental information infrastructures provided by DIAS. In addition, this project aims to cultivate experts who can construct and utilize this database in actual policy making fields.

To achieve this goal, a re-design of national land and society for a reduplicative system in both normal and emergency situations is necessary. Both a ”safety and security” concept, which takes account of damage reduction, and a ”sustainability” concept which tackles low carbon, energy saving, and prevention of climate change, are needed in order to keep pace with the threats of predicted huge earthquakes and climate change.

2. Contents

Natural hazards caused by climate change, earthquakes and other disasters may be increasing, and could strike in the near future our vulnerable society which is characterized by with declining birth rate and a growing proportion of elderly people, population decline, urban sprawl and etc. Based on the common recognition on these problems, this research project sets out to construct a methodology to lead to safer peaceful mind and sustainable national land and society by using DIAS.

The system needs to use data on natural and social situations. The data on natural situations includes earthquakes, climate change and disasters. The data on social situations include population structure, economic conditions, infrastructure, and land use. Additionally, not only the present data, but also historical data, such as land use and infrastructure change, record of disasters, population structures, and other information, are collected. Therefore ”four-dimensional GIS” will be constructed to allow quantitative prediction and to evaluate policies considering historical faces, past place names, and other qualitative information.

In consequence, the system will analyze the vulnerability of national land and society caused by social, geographical, and other conditions, and natural variations and disaster risks. This system supports the examination of various policies, especially, the effectiveness of ”Smart shrink” which could stop urban sprawl.

3. Results and future works

1) Information archives

This project collected historical data on earthquakes, tsunamis, and other natural disasters from old documents and other resources. In particular, records of tsunami damages of the Great East Japan Earthquake are stored. A prototype Web-GIS is developed to show these photos and tsunami height with map information.

2) Analysis and design

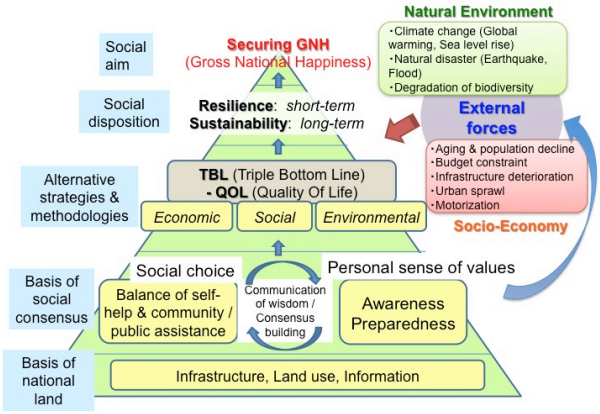
This project offers the evaluation of national land and cities with a view to safety, security, and sustainability. The system introduces QOL (Quality of Life) indicators. Data about accessibility, amenity, and disaster vulnerability to calculate QOL indicators are collected and added to the system. This will be utilized to illustrate conditions of residential amenity and disaster vulnerability in each area of the national land.

3) Utilization and deployment

This evaluation system will be applied to case study cities and regions. The problems and demands of the system will also

be clarified. As a result, the system and database will be developed to accommodate requests from policy planning of city and national land.

Keywords: resilient national land, sustainability, natural disaster, triple bottom line



Japan Geoscience Union Meeting 2014
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U01-11 Room:419 Time:May 1 12:00-12:15

Population health and global data sciences in Grene Ecohealth project

KANEKO, Satoshi[1*] ; WATANABE, Chiho[2] ; MOJI, Kazuhiko[3] ; NISHIMOTO, Futoshi[4] ; TIENGKHAM, Pongvongsa[5]

[1]Institute of Tropical Medicine, Nagasaki University, [2]School of International Health, Graduate School of Medicine, The University of Tokyo, [3]Graduate school of international health development, Nagasaki University, [4]Research institute for humanity and nature, [5]Savannakhet Provincial Health Department, the Lao People's Democratic Republic

Age of global and big data has come. The amount of data explosively increase and the expectations of exploring such data and effective utilization of data analysis results go wide of the mark. We enjoyed somehow the benefits from the big data analysis in daily life and some of the field in sciences; however, how can it be delivered to the health field, especially in areas or regions where the data collection is difficult due to the luck of data collection system? In developed countries, we can have data related to health and it has been already used for improvement public health service system. Furthermore, it has been linked to environmental data to know the results from climate and environmental changes. But this is only limited to developing countries and data or information from developing countries or regions, where the most vulnerable people from climate changes live and no information exists even on population, is still lack in identifying and monitoring the real situation. To sort out such information lack situation, the GRENEcoH project, a GRENE-Ecohealth project that is running under the GRENE-environmental information program, has started data collection of population health in areas in the Lao People's Democratic Republic using up-to-date technology to collect and link individual data. The system called in general as Health and Demographic Surveillance System (HDSS), which collect information about residents in the certain given areas for research. The HDSS programs are run in different areas and by different organization in African and Asian countries, however, in Japan; the HDSS is not paid enough attention. In this presentation, the introduction and the scientific and social values of HDSS and our technology will be presented.

Keywords: developing countries, marginal areas, population health, infectious disease

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U01-12 Room:419 Time:May 1 12:15-12:30

Development of DIAS Metadata System

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We are developing a metadata system in the Data Integration and Analysis System (DIAS) project sponsored by Japan Ministry of Education, Culture, Sports, Science and Technology. A major goal of the DIAS metadata system is to collect all metadata of earth observation data produced under the projects sponsored by Japanese government. The DIAS metadata system is comprised of metadata registration system, metadata retrieval system, and download system.

Cooperation with other data centers is also an important goal of the DIAS metadata system. We have imported metadata from JAMSTEC (Japan Agency for Marine-Earth Science and Technology) data catalog and JaLTER (Japan Long Term Ecological Research Network) database, and supported integrated metadata search through the DIAS retrieval system. On the other hand, by exporting DIAS metadata, DIAS is now listed in the Earth Observation Catalogs of GEOSS Portal. We are developing a metadata coordination system to make it possible more comprehensive exchange of metadata among data centers.

Keywords: earth observation data, metadata

Japan Geoscience Union Meeting 2014
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U01-13 Room:419 Time:May 1 12:30-12:45

Design and proposal of operational DIAS

NISHIMURA, Hajime[1] ; KAKUTA, Shinya[1*] ; KOIKE, Toshio[2] ; FUKUDA, Toru[3] ; NOJIRI, Yukihiro[4]

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Data Integration and Analysis System (DIAS) is intended to create new scientific knowledge and public benefits through integration of various data under collaboration with stakeholders, in order to become a social infrastructure to make new innovations and social growth. DIAS will provide information toward resilient society and mitigation on social problems related to global environment, including resource management, bio-diversity, and natural hazards, by utilizing data on earth observation, climate-variability prediction, socio-economy, and so on.

Data Integration and Analysis System Program (DIAS-P) started in 2011 as the second phase, aiming at (a) designing and proposing an operational scheme (operational DIAS) to realize public benefits through its operational application for global-scale solutions with sustainable scientific cutting-edge advancement, as well as (b) prototyping the operational regime with intelligent infrastructure to create new value, and (c) enabling stakeholders in various fields to together leverage the fusion of super-large-scale various data sets and information.

Japan Agency for Marine-Earth Science and Technology (JAMSTEC) is collaborating with the University of Tokyo EDITORIA, Japan Aerospace Exploration Agency (JAXA), and National Institute for Environmental Studies (NIES) to design the operational DIAS and present a tentative reference model including its roles. The infrastructure and schemes shown in the reference model will be the first practice if realized. This reference model has been designed in consideration with relevant progresses in relating research programs, and will be annually amended.

To achieve the above-mentioned objectives, DIAS comprehensively manages and publishes metadata as an integrated portal to provide and distribute the following data; (1) observation data listed in ”Japan Earth Observation Implementation Plan,” (2) observation data collected in each state to contribute toward nine social benefit areas of ”Global Earth Observation System of Systems” (GEOSS), (3) observation data available in partner states under bilateral or multilateral collaboration, (4) data obtained through Application Workbenches, which are intelligent infrastructure to support projects toward application to each field, and (5) data provided by Function-Improvement Partners, which are inter-organization partnership to sustainably improve functions of DIAS. Their targeted fields include socio-economy, agriculture and fishery, land use and land cover, transportation network on roads and ports, landscape, and hazards. It is to be discussed how to create an environment where archives are acknowledged as research results.

The core infrastructure of DIAS will consist of large-scale storages to archive the data, and of analysis space and tools to analyze large-scale data.

The operational DIAS expects decision-makers (in domestic and developing countries) on resource management, disaster-protection, etc. to be the major users. The major users of integrated data and analysis function of DIAS will be not only researchers (science communities) who provide decision-makers with evidence but also stakeholders who collaborate on Application Workbenches. Moreover, end-users, social movements, and civilian services are also expected to use DIAS through access to the DIAS portal site.

For the above-mentioned purposes, we developed a remote collaboration system (ubiDIAS) utilizing open sources, and studied various policies and United Nations’ Sustainable Development Goals.

Keywords: DIAS, operation, design

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Activities of the Union Commission for Data and Information of the International Union of Geodesy and Geophysics

FOX, Peter[1*] ; BARTON, Charles[2]

[1]Rensselaer Polytechnic Institute, [2]Australian National University

The data and information activities of IUGG, International Union of Geodesy and Geophysics, will be introduced, from a viewpoint of IUGG's Union Commission for Data and Information.

Keywords: IUGG, Data and Information, eGY

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U01-15 Room:419 Time:May 1 14:40-14:55

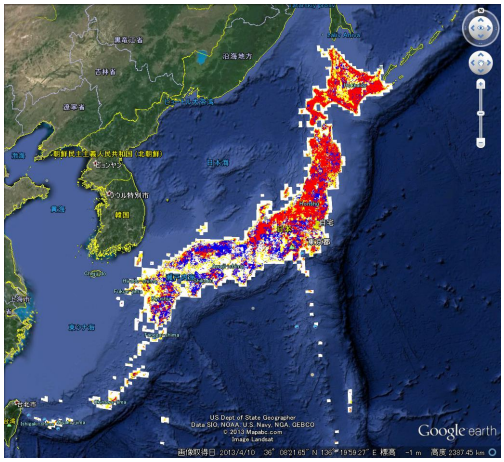
The Laud Use Information System (LUIS) Database which has been developed under the GRENE-ei biodiversity area

NAKAJIMA, Hideaki[1*] ; HIMIYAMA, Yukio[2] ; SAIGUSA, Nobuko[1] ; NOJIRI, Yukihiro[1]

[1]National Institute for Environmental Studies, [2]Hokkaido University of Education, Asahikawa Branch

We, the Office for Global Environmental Database, at the Center for Global Environmental Research (CGER), in National Institute for Environmental Studies (NIES), has been developing a new database called the Land User Information System (LUIS). LUIS is a database which was provided from NIES as one of the databases of GRID-Tsukuba before. LUIS is a database to visualize the land use in Japan which was extracted from the topographical maps of the Geospatial Information Authority of Japan in three different eras, i.e., Meiji-to-Taisyo era (around 1900s), early Syowa era (around 1950s), and late Syowa era (around 1985). The land use information was extracted in each 2x2 km mesh of 1:50,000 topographical map for the upper left corner, the maximum land use, and existing land use. We have developed a program to plot the land use, on a simple Japanese map and on Google Earth view screen. The figure shows the distribution of broadleaf trees in 1900s and 1985. Red area represents the existence in both era, blue represents the extinction, and yellow represents the appearance. We are thinking of distributing the map from the CGER's Database Web server in future. Current status and future plan of the LUIS database will be presented.

Keywords: database, land use, LUIS, topographical map, GRID-Tsukuba



Japan Geoscience Union Meeting 2014
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U01-16 Room:419 Time:May 1 14:55-15:10

Arctic Data archive System(ADS)

YABUKI, Hironori[1*] ; SUGIMURA, Takeshi[2]

[1]Japan Agency for Marine-Earth Science and Technology, [2]National Institute of Polar Research

Of all the regions on the planet, the Arctic currently shows the biggest rise in average temperature due to global warming, and is one of the regions expected to become most affected by climate change on the Earth in the future. The change in the Arctic area brings a profound impact to the global climate system through changes in interactions between the atmosphere, ocean circulation, and the cryosphere. These climate changes not only impact upon human activities, but also the Arctic flora and fauna ecosystem.

Large parts of the observations and mechanisms of the environmental change, including the climate of the Arctic region, are still not well understood. In order to further our understanding of these complex systems, an integrated study carried out with continuous observations in the Arctic is proposed. In the Arctic Environmental Observation Center in the National Institute of Polar Research, operations began on the Arctic Data archive System (ADS) in March 2012, in order to promote the mutual use of scientific data.

The purpose of the Arctic Data archive System is to archive and distribute multiple observational (atmosphere, ocean, terrestrial, and ecology) and model simulation datasets, and promote utilization of these datasets. ADS is the central repository of archived data on Arctic research in Japan.

Keywords: Arctic, Environment, Global Warming, ADS

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U01-17 Room:419 Time:May 1 15:10-15:25

JAXA's contributions for Earth and Planetary research using earth observation data

FUKUDA, Toru[1*]

[1]Earth Observation Research Center, JAXA

JAXA's earth observation satellites play an important role in providing essential information for Earth science and applications regarding global warming, climate change, water cycle change, agriculture, public health and disaster management.

JAXA have been operating Greenhouse gas Observing SATellite (GOSAT), and Global Change Observation Mission-Water 1 (GCOM-W1) successfully. These satellites are collecting geophysical data of the earth's surfaces and atmosphere those are important for the earth and planetary researches.

In addition to those ongoing earth observation satellite missions, new satellites will be added to the line.

One is GPM (Global Precipitation Measurement), the successor of TRMM focusing to measure precipitation. Another one is ALOS-2 (Advanced Land Observing Satellite) carrying an L-band synthetic aperture radar. Those new generation satellites will contribute to observe disaster, earth resources, climate change, water cycle, etc.

JAXA will make continuous efforts to create and provide satellite-based information for not only scientists but also decision makers and stakeholders in order to contribute to solving global and regional issues. In order to make such information useful, close collaboration with various players in various sectors is essential.

Keywords: GCOM, ALOS, GPM, TRMM, GOSAT

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U01-18 Room:419 Time:May 1 15:30-15:45

IUGONET project and its products for multidisciplinary study on upper atmospheric physics

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In order to investigate the mechanism of long-term variations in the upper atmosphere, it is crucially important to make cross-cutting studies with various kinds of data observed between Sun and Earth region. Thus, it is needed to combine databases which maintained by each institute and to accelerate to make data-sharing network in the STP community. The IUGONET (Inter-university Upper atmosphere Global Observation NETwork) project was established in 2009 as a six-year research project supported from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan. It consists of the five Japanese universities and institutes (NIPR, Tohoku University, Nagoya University, Kyoto University, and Kyushu University, that have been leading ground-based observations of the upper atmosphere for decades), and collaborates with many domestic (for example, the National Institute of Information and Communications Technology (NICT), the National Astronomical Observatory of Japan (NAOJ), and the Kakioka magnetometer observatory, Japan Meteorological Agency) and overseas institutes/projects (for example, ESPAS in EU). One of our products in the IUGONET data management framework is developing systems for searching metadata of these observational data, and the metadata database (MDB). In the STP community, there are various kinds of archived data observed by many instruments, for example radars, magnetometers, photometers, radio telescopes, helioscopes, and so on. The IUGONET MDB is based on DSpace as a metadata registering system, which is mainly used in literature management. It also adopts an extension of the SPASE data model as a metadata format, which is widely used in the upper atmospheric community in USA. As a result, this system can deal with all kind of data belonging to IUGONET institutes, including cosmic ray, meteorological information observed by automatic weather station, etc. The system can also get flexibility to other type of data including the satellites and the numerical simulation which are used in the STP community. It is one of our challenges to apply the IUGONET system to many kinds of data in other communities. This MDB system is in operation since 2011 with over 10 million metadata. Other challenge of the IUGONET is developing software which can use for scientific research and publication. The iUgonet Data Analysis Software (UDAS) is a plug-in software of Themis Data Analysis Software (TDAS), which is upgraded to Space Physics Environment Data Analysis System (SPEDAS). The UDAS provides many routines for loading the ground-based observational data from various types of instruments, and performing scientific data analysis. This platform made it easier for STP community to analyze a various kind of data in a unified way. The IUGONET project will be closed at the end of fiscal year 2014. In this presentation, we will introduce the achievements and problems of our six-year project and discuss futures for global data sharing and research.

Keywords: Solar-Terrestrial Physics, metadata database, data analysis software, IUGONET

Japan Geoscience Union Meeting 2014
(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U01-19 Room:419 Time:May 1 15:45-16:00

Introduction of NICT ionospheric data archive system

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[1]NICT

NICT has a long history of operational ionospheric observation with ionosondes since IGY 1957. On the beginning, we had four domestic observatories, Wakkanai, Akita, Kokubunji and Yamagawa. After that Akita was closed and Okinawa joined and we operate these four observatories continuously. In addition, Syowa station in Antarctica has been observing ionosphere by NICT since IGY, too. In addition as the World Data Center for ionosphere, we have a lot of number of ionospheric data obtained by foreign institutes.

The present ionosonde system named 10C provides digital image of ionogram. However, all other previous systems provide analog image and recorded on films. Now it becomes a serious problem to lose data by corrupted of films. The only solution of this issue is to digitize the film image but usually the cost is very high. We search the way to keep low cost and comfortable quality for future analysis and find a method named ribbon scanning. In this method we keep whole of one film data in one file, which makes cost low and avoid losing data by frame skipping. We had trial of resolution of digital image and confirm the quality is same level of original image.

We already had some fruitful results using these data archive. Maruyama et al. [2012] shows the statistic results of ionospheric variation after large earthquakes. Other than these kinds of study we expect the archive is useful for discussion of long-term variation of ionosphere with climate change. For improving the use of these dataset we need to solve another issue. Film-digitized images are suitable to manual scaling with naked-eye but we cannot use these data automatically because the axes vary in each image. To solve the issue we need to try image analysis to detect the axes automatically.

Reference

Maruyama, T., T. Tsugawa, H. Kato, M. Ishii, and M. Nishioka, Rayleigh wave signature in ionograms induced by strong earthquakes, J. Geophys. Res., DOI: 10.1029/2012JA017952.

Keywords: WDS, WDC, ionosphere, space weather

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U01-20 Room:419 Time:May 1 16:15-16:35

The Current and the Future of AIST GEO Grid Technologies- A Case Study of Fukushima Radiation Monitoring Application

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The Current status and future perspetive will be discussed of ”GEO Grid” Technologies which have been studied and developed at AIST (National Institute of Advanced Industrial Science and Technology). Also a case study of Fukushima Radiation Monitoring Application will be reviewed.

Keywords: GRID computing, geoscience data, database technology, information technology, RDA, ICSU-WDS

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U01-21 Room:419 Time:May 1 16:35-17:05

Making Dynamic Data Citable: Approaches to Data Citation within the Context of the RDA Working Group

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Being able to reliably and efficiently identify entire or subsets of data in large and dynamically growing or changing datasets constitutes a significant challenge for a range of research domains. In order to repeat an earlier study, to apply data from an earlier study to a new model, we need to be able to precisely identify the very subset of data used. While verbal descriptions of how the subset was created (e.g. by providing selected attribute ranges and time intervals) are hardly precise enough and do not support automated handling, keeping redundant copies of the data in question does not scale up to the big data settings encountered in many disciplines today. Furthermore, we need to be able to handle situations where new data gets added or existing data gets corrected or otherwise modified over time. Conventional approaches, such as assigning persistent identifiers to entire data sets or individual subsets or data items, are thus not sufficient.

In this talk we will review the challenges identified above and discuss solutions that are currently elaborated within the context of the working group of the Research Data Alliance (RDA) on Data Citation: Making Dynamic Data Citable. These approaches are based on versioned and time-stamped data sources, with persistent identifiers being assigned to the time-stamped queries/expressions that are used for creating the subset of data. We will further review examples of how these can be implemented for different types of data and see how this fits into the larger context of activities on Data Citation.

Keywords: Research Data Alliance, data citation, dynamic data, information technology, interoperability

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U01-22 Room:419 Time:May 1 17:05-17:20

Recent activity of DOI-minting to database by WDCs in Japan

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[1]WDC for Geomagnetism, Kyoto University, [2]WDC for Ionosphere and Space Weather, NICT, [3]WDS Scientific Committee, NICT, [4]WDC for Aurora, National Institute of Polar Research, [5]WDC for Space Science Satellites, JAXA

Recent electronic journals are published with DOI (digital object identifier) such as doi:10.1029/2012SW000785. DOI is a persistent name that is resolved into URL, where readers can obtain digital objects of the journal articles; for example, abstract, figures, and pdf files. The DOI system was launched around 2000 and becomes popular these days so that DOI is ordinarily indicated in references and citations.

The next development of the DOI system is to extend it to database. It makes possible for researchers to cite the data used in a scientific publication, which is called ”data citation”. Data citation provides the following benefits:

• Readers can more easily locate the data used in the paper, obtain necessary information of the data (i.e., metadata), and validate the findings of the paper.

• Readers can also easily discover datasets which are relevant to their interests but has not been noticed.

• Data contributors can gain professional recognition and rewards for their published data in the same way as for traditional publications.

• Data centers can measure the impact of individual datasets and receive proper credit of their work.

Recognizing the importance of data citation, World Data Centers (WDCs) in Japan including WDC for Aurora (National Institute of Polar Research), WDC for Geomagnetism (Kyoto University), WDC for Ionosphere and Space Weather (National Institute of Information and Communications Technology), and WDC for Space Science Satellites (Japan Aerospace Exploration Agency) started discussion to mint DOI to their own database in August 2013. The discussion finds that Japan Link Center (JaLC) is a proper agency to register DOI-URL mapping, because JaLC aims at public information services to promote science and technology in Japan and it handles scientific and academic metadata and content from holders nationwide, including national institutes, universities. Two representatives of the above 4 WDCs are working closely with JaLC to define a registration scheme to implement the DOI-URL mapping. We are also developing a web-based system to register metadata with JaLC and create landing pages for database. We expect to start a pilot program to mint DOI to the database from the middle of 2014.

Keywords: DOI, Database, Data Citation, Data Publication

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(28 April - 02 May 2014 at Pacifico YOKOHAMA, Kanagawa, Japan)

U01-23 Room:419 Time:May 1 17:20-17:45

Interlinking Articles And Data? The Past, Present, And Future

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[1]Elsevier

Activities of linking scholarly articles and scientific data will be introduced.

Keywords: data publication, scholarly article, data citation

Japan Geoscience Union Meeting 2014
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U01-24 Room:419 Time:May 1 17:45-18:00

Open Science Data Discovery Platform

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Technology and use case studies of ”Open Science Data Discovery Platform” will be introduced. So far we have harvested approximately 0.6 million metadata of data citation (DOIs and related metadata given to datasets) from publicly open databases of ICSU-WDS, PANGEA, ICPSR, etc., and have been developing new technology to leverage those data-citation link information and scholarly article archives. This technology, including linguistic, time-space, and ontological analysis techniques, is expected to have potential to enable new knowledge finding from various relations between datasets and articles, as well as analysis of higher-class clustering and grouping structures of relationships and links between science-technology information sources and even various communities which are related to science and technology data and articles. Through this process, perhaps to be like easy user-interface in future (like Web of Science), even international perspectives will be easily captured of more general science and technology research information pieces, links, and inter-relations to each other. For example, regarding climate change prediction and related decision making we may be able to find easily by an online search system how different earth observation datasets are used in political papers and meteorological papers.

Keywords: Scientific data, ICSU-WDS, database technology, data search, data citation

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U01-P01 Room:Poster Time:May 1 18:15-19:30

Construction of spatio-temporal data mining system for time-series satellite imagery using Hadoop

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A large number of spatio-temporal data have been stored in various fields of science, such as remote sensing, numerical simulation, and astronomical observation, in which data often appears as time-series images. To extract spatio-temporal knowledge from spatio-temporal data including time-series images, spatio-temporal cross section relevant to a target task has to be extracted from a mass of data. Since these data are stored as a large number of files, utilization of distributed processing framework such as Hadoop or Gfarm is promising.

We constructed distributed data mining system for time-series satellite images using 53 nodes (3 masters and 50 slaves at maximum) of iMac and Hadoop which enables distributed file system and distributed processing using MapReduce. We evaluated the scalability and performance of the system for the task extracting time-series data from a large number of images carefully and found that partitioning the images into optimum numbers and reducing the data between map phase and reduce phase is essential.

The system was then applied to two different tasks focusing on time-series data analysis extracted from satellite imagery: statistical modeling of seasonal changes in vegetation index and spatio-temporal correlation analysis of weather satellite images. The tasks were successfully implemented on the system and the computational time was decreased in inverse proportion to the number of slave nodes, thus usefulness of the distributed system to spatio-temporal data mining for time-series images.

Keywords: distrubuted processing, Hadoop, MapReduce, data mining, spatio-temporal, satellite imagery

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U01-P02 Room:Poster Time:May 1 18:15-19:30

Basic Technologies, Integrated Systems and Applications of the NICT Science Cloud

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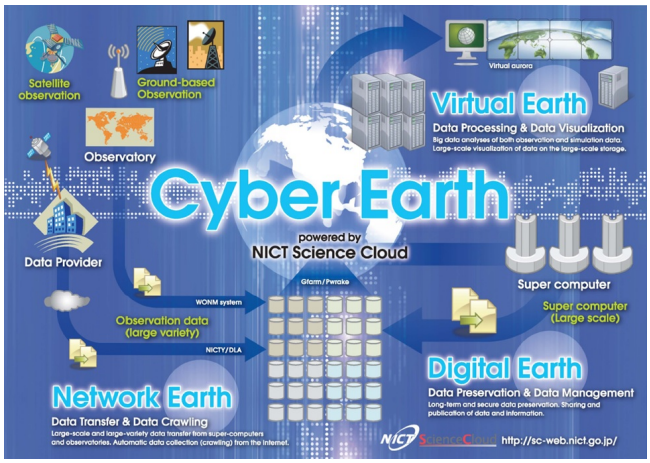
This paper is to propose a cloud system for science, which has been developed at NICT (National Institute of Information and Communications Technology), Japan. The NICT science cloud is an open cloud system for scientists who are going to carry out their informatics studies for their own science. The NICT science cloud is not for simple uses. Many functions are expected to the science cloud; such as data standardization, data collection and crawling, large and distributed data storage system, security and reliability, database and meta-database, data stewardship, long-term data preservation, data rescue and preservation, data mining, parallel processing, data publication and provision, semantic web, 3D and 4D visualization, out-reach and in-reach, and capacity buildings.



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U01-P03 Room:Poster Time:May 1 18:15-19:30

Global spectral crustal model

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We compile the harmonic coefficients, which describe the Earth crustal density structure with a spectral resolution complete to degree/order 180. These coefficients can be used in gravimetric studies of the Earth lithosphere structure, isostasy, crustal loading, sedimentary basins and related topics. The global spectral crustal model is separated into 9 specific layers of the topography, bathymetry, polar ice sheets, sediments (3-layers) and consolidated crust (3-layers). The harmonic coefficients describe uniformly the geometry and density (or density contrast) distribution within each crustal component. The topographic and bathymetric coefficients are generated from the topographic/bathymetric model ETOPO1 and the global geoid model GOCO03s. A uniform density model is adopted for the topography. The ocean density distribution is approximated by the depth-dependent seawater density model. The ETOPO1 topographic and the DTM2006.0 ice thickness data are used to generate the ice coefficients, while assuming a uniform density of the glacial ice. The geometry and density distribution within sediments is described by the 3 stratigraphic layers of a laterally varying density model, and the same structure is used to describe the density distribution within the consolidated crust down to the Moho interface. The sediment and consolidated crust coefficients are generated from the global crustal model CRUST1.0. The density contrasts of the ocean, ice, sediments and remaining crustal structures are taken relative to the reference crustal density.

Keywords: crust, density, gravimetric forward modeling, harmonic analysis