

## Arctic Data archive System(ADS)

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A new project of the Arctic research (ArCS :Arctic Challenge for Sustainability) has been started in 2015. ArCS is a national flagship project funded by the Ministry of Education, Culture, Sports, Science and Technology. The National Institute of Polar Research (NIPR), Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and Hokkaido University are playing the key roles in this project, and will continue to carry it out for approximately four-and-a-half years from September 2015 to March 2020. Arctic Data archive System (ADS) is responsible for the data management of this project.

Arctic Data archive System (ADS), to promote the mutual use of the data across a multi-disciplinary to collect and share data sets, such as observational data, satellite data, and numerical experiment data. Through these data sets, clarify of actual conditions and processes of climate change on the Arctic region, and further contribute to assessment of the impact of global warming in the Arctic environmental change, to improve the future prediction accuracy.

Keywords: Arctic, Global Warming, ArCS

## DIAS metadata input camp as an Open Science activity

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The Data Integration and Analysis System (DIAS) started from 2006. The goals of DIAS are to collect and store earth observation data; to analyze such data in combination with socio-economic data, and convert data into information useful for crisis management with respect to global-scale environmental disasters, and other threats; and to make this information available within Japan and overseas. The current project of phase III has started since 2016 with the aim of its practical operation.

From October 2010, we have released data of DIAS with Document-metadata, describing about dataset in English and Japanese. DIAS has a mission to accelerate the accessibility of data created and maintained by institutions implementing Earth observation projects through creating Document-metadata in the DIAS metadata creation support tool. Anyone can use the DIAS data discovery system by accessing <http://search.diasjp.net>, and can download data files of 270 DIAS released datasets, can access 80 datasets outside DIAS through the system. We are also collecting metadata from related data centers and which is searchable and accessible through the system.

Until now, we have had workshop concerning about metadata input 6 times as “DIAS metadata input camp”. The initial workshop participants were the data owners or providers who should create Document-metadata. The recent workshop increased librarians who are interested in research data management of open science. In order to share how to cataloging research data using Document-metadata, in the workshop, participants had experienced the difference between the metadata of the research data and the metadata of the literature. We report issues about how to manage metadata to data providers and librarian and issues about how to introduce research data to wide users in an easy-to-understand manner using metadata.

Keywords: DIAS, Earth Observation data, Metadata, Open Science

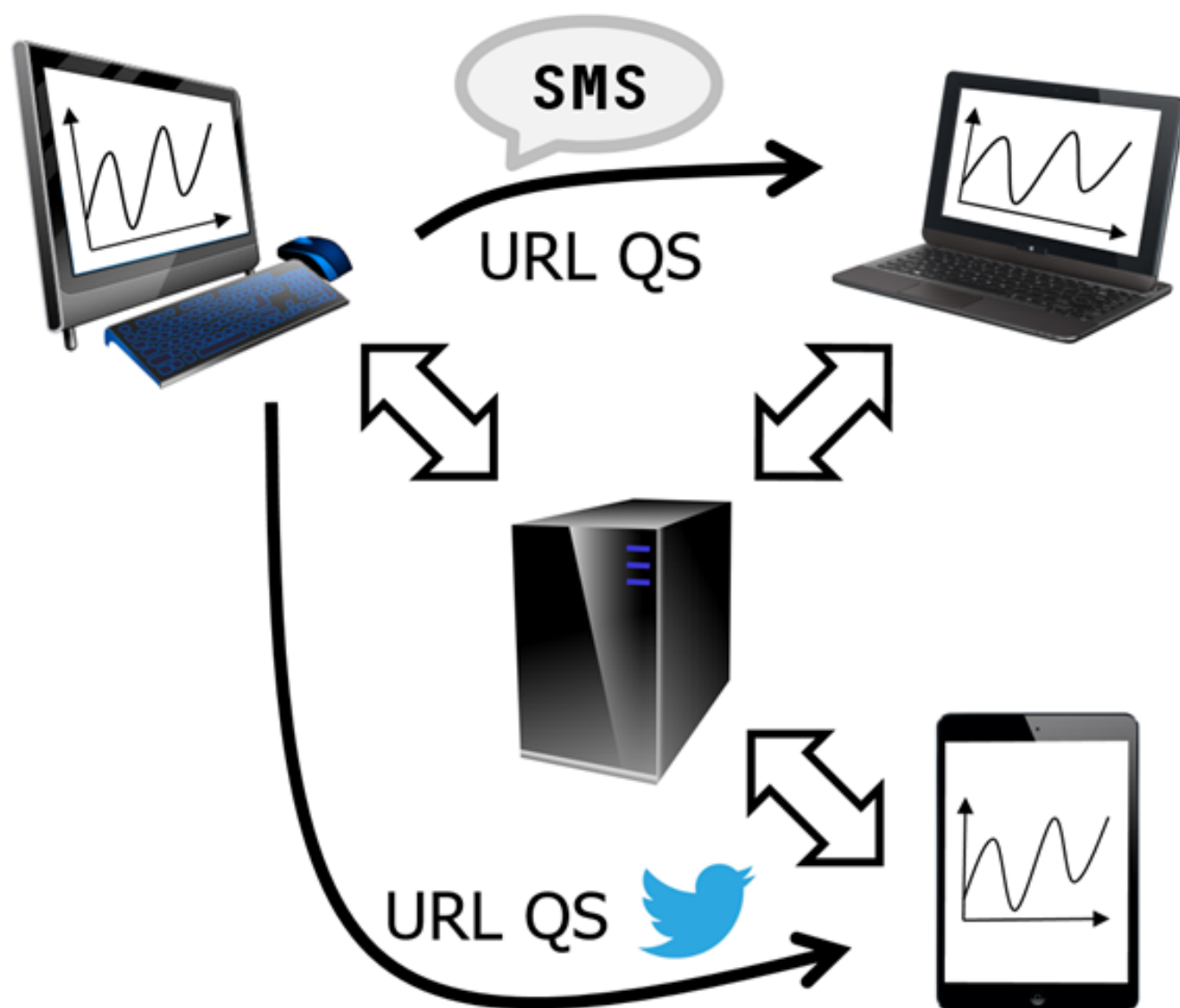
## Web service for reproducible multidisciplinary data visualization

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We propose a new method for reproducible data visualization on a web browser. A web service, Cross-Cutting Comparisons (C3) has a query string (QS)-controllable system to make various interactive charts of earth, planetary and space sciences. By including information of data handling procedures in the QS in an orderly manner, the chart is easy to understand, remake and share via text-based communication tools.

Keywords: open data, open science, citation



## Start-up of earth observation by a small laboratory

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In Japan, there is an institution of higher education which is different from university system.

There are National Institute of Technology (NIT) in Japan in total of 51 colleges. The head quarter is located in Tokyo, but the each college is established in most in 47 prefectures in Japan. Because it's scattered about a various part of Japan, those are a strong potential earth observation base.

The NIT, Oita College is located in Oita Prefecture, Kyushu, Japan.

Because the vocational researcher is little again, too, because they're higher educational facilities, but he makes the young generation the subject, there is a problem with the continuity of the study.

However, it's potential because I split regionally.

Keywords: Meteor, Radio observation, Multi-point observation, Data sharing, Metadata, Identifier

# Terminological Ontologies and Vocabulary Broker for Open Science

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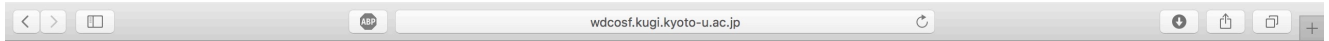
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Keyword vocabularies as part of metadata standards, such as NASA GCMD DIF, SPASE data model, ESPAS keyword ontology or UAT thesaurus are used to tag and qualify specific metadata elements in a standardised way. The different concepts behind the used keywords transport specific semantic knowledge about features of the tagged elements. The scope and the validity of the concepts and keywords normally is limited to a specific domain, such as earth and space physics or astronomy. Natural language is used to express the semantic of the concepts and appropriate keywords. Therefore diverse keywords are used in different metadata standards to express same or very similar concepts. Even in the same domain different keywords are used to describe the same concept. Out of that there is the problem using keywords for the search of data within different repositories. In order to overcome this challenge, we have developed a semantic Web based Vocabulary Broker framework which is connecting appropriate keywords mainly using "skos:closeMatch" relationships for the expression of concordances.

Terminological ontologies derived from the above mentioned metadata standards are processed, and semantic based keyword matches are generated. The original ontology and the mapped parts are managed by the Open Semantic Framework (OSF). The Vocabulary Broker application provides both, schema based browsing and keyword search features. The main idea of the Vocabulary Broker, the semantic (Web) based mashup of keywords, prepares the way for a seamless and overlapping data search within different data repositories, which are managed by different metadata standards. This idea works within a domain or even cross-domain. Therefore our approach is a valuable contribution to mashup data and knowledge within an Open Science environment.

Vocabulary Broker URL: <http://wdcosf.kugi.kyoto-u.ac.jp>

Keywords: Metadata Standard, Keyword Vocabulary, Terminological Ontology, Matching Ontologies, Vocabulary Broker, Open Science



**World Data System Vocabulary Broker - Proof of Concept** - A +  
 Linking Research Data

Home | [GCMD Keywords](#) | [SPASE Keywords](#) | [ESPAS Keywords](#) | [UAT Keywords](#)

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**Update of Search Results page**

Submitted by wdcosf on Fri, 08/26/2016 - 19:55

To improve user experience we modified the presentation of search results when performing a "Concept Search". Instead of just displaying the Concept keyword, we now show additional context information like the keyword scheme to which the term belongs (GCMD, SPASE, ESPAS or UAT respectively), a short definition of the term if available from the vocabulary maintainers, and direct links to <skos:relatedMatch> or <skos:closeMatch> keywords from other vocabularies, if they exist.

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**Integration of UAT vocabulary**

Submitted by wdcosf on Thu, 08/11/2016 - 22:20

The domain-oriented [Unified Astronomy Thesaurus](#) vocabulary is based on concepts which are also used in neighboring domains, such as geophysics, especially magnetic field research, near earth-space exploration and solar-terrestrial physics. The space weather and space climate domains are covered by UAT concepts too. Therefore we think, the integration of the UAT vocabulary into the Vocabulary Broker is a benefit for astronomers but also geo and space scientists.

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## IUGONET Type-A: web service for solar-terrestrial science

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IUGONET is a community to promote solar-terrestrial physics studies, which NIPR, Nagoya Univ., Kyoto Univ., Tohoku Univ., Kyushu Univ., NICT, NAOJ, JMA and Kanazawa Univ participate in. Our team has mainly developed two products, i.e., UDAS and IUGONET Type-A. UDAS is an analysis software based on SPEDAS (Space Physics Environment Data Analysis Software) and IDL (Interactive Data Language), and IUGONET Type-A is a web service to provide data information and web-based analysis platform 'UDAS web'.

IUGONET Type-A was opened to public on 1 Nov, 2016. This service has functions to show metadata of observational data (e.g., description, acknowledgement [data policy], start and stop date, contact person, data publisher URL, observatory and instrument information), quick-look images (QLs), and how to create these QLs. In particular, thumbnail display of QL plots of retrieved data is very useful to view various data and find correlated data. In addition, UDAS web enables to plot data easily on web browser (PC, smartphone, tablet device and more) without any installation/setup of dedicated software and license. Therefore, IUGONET Type-A is an one-stop web service that enables to search, understand, visualize and test data, and promotes new interdisciplinary studies regarding the solar-terrestrial physics even for researchers in emerging countries.

Furthermore, IUGONET Type-A was built by 'IUGONET Web Application Framework for Science'. This framework can also handle various metadata formats and work on other system. For example, this framework is now being used for Fukushima radiation database, RADARC, and in future we will divert it to some database for various data, such as meteorological data, sequential (ensemble-based) data, and the other scientific data. We believe that this framework is useful to share scientific knowledge between wider communities and can contribute to open science.

Keywords: solar-terrestrial environmental science, open science, open data, database system

## Activity for promoting interdisciplinary studies of solar-terrestrial physics

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Inter-university Upper atmosphere Global Observation NETwork (IUGONET) is a Japanese inter-university project whose goal is to effectively utilize upper atmospheric data, including solar and planetary data, which have been separately archived by Japanese universities and institutes for more than 60 years. This project was established in FY2009 originally by Tohoku University, Nagoya University, Kyoto University, Kyushu University, and National Institute of Polar Research, that have been conducting global ground-based network observations of the upper atmosphere, and several other universities and institutes joined in the project later. We present our activities for sharing the data, facilitating interdisciplinary studies of solar-terrestrial physics, and promoting open science.

We have mainly developed two tools, i.e., an analysis software and a metadata database for the upper atmospheric data. The analysis software is based on Space Physics Environment Data Analysis Software (SPEDAS) that is a grass-roots software written by Interactive Data Language (IDL) for space physics community and supports multiple missions. We have provided a plug-in software for SPEDAS, which allows users to load, visualize, and analyze the IUGONET data with SPEDAS. The metadata database enables users to cross-search various kinds of the upper atmosphere data distributed across the IUGONET members. We have registered the metadata of more than 1,000 dataset made in the Space Physics Archive Search and Extract (SPASE) format to our metadata database. Recently, we newly released IUGONET Type-A, which is a one-stop web service based on the metadata database. The IUGONET Type-A provides services to search data, show information of data (i.e., metadata), display quick-look (QL) plot of data, and plot data interactively with SPEDAS. It is useful for users to find interesting solar-terrestrial phenomena and proceed to more detailed analysis of them by using SPEDAS. In order to explain how to use these IUGONET data and tools, we hold tutorial seminars several times a year in Japan and sometimes foreign countries. In addition, we introduce our various activities for data sharing and open science.

Keywords: upper atmosphere, metadata database, data analysis software, solar terrestrial physics, IUGONET project



## Juno-Ground-Radio Observation Support Tools

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In the frame of the NASA/Juno mission, an international support activity with observations in the low frequency radio range has been set up. We are proposing a new set of tools directed to data providers as well as users, in order to ease data sharing and discovery. The data service we will be using is EPN-TAP, a planetary science data access protocol developed by Europlanet-VESPA (Virtual European Solar and Planetary Access). This protocol is derived from IVOA (International Virtual Observatory Alliance) standards. Data from all major decametric radio instruments will contribute: Nançay Decameter Array (France), LOFAR (France, Sweden, Poland), URAN (Ukraine), LWA (USA), Iitate Radio Observatory (Japan), etc. Amateur radio data from the RadioJOVE project is also available. We will first introduce the VO tools and concepts of interest for the planetary radioastronomy community. We will then present the various data formats now used for such data services, as well as their associated metadata. We will finally show various tools that make use of this shared datasets. This activity also supports the development of the ESA/JUICE (Jupiter Icy Moon Explorer) mission, and that of the planetary sciences virtual observatory.

Keywords: Jupiter, Decametric Radio Emissions, Juno, Virtual Observatory

## WDS Asia-Oceania Conference 2017

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The World Data System (WDS) is an Interdisciplinary Body of the International Council for Science (ICSU) with a mission to promote international collaboration on long-term preservation and provision of quality-assessed research data and data services. ICSU-WDS is a membership organization that federates trustworthy scientific data services—and networks thereof—across a range of disciplines in the Natural and Social Sciences, as well as the Humanities. ICSU-WDS has 76 Regular and Network Members and 25 Partner and Associate Members as of December 2016. The Asia–Oceania region comprises 14 WDS Regular Members. The WDS Asia–Oceania Conference 2017 will reinforce the WDS community in this region, and help establish a collaborative system for access to and dissemination of research data. The principal objectives of the conference are: (1) Strengthen collaboration among China, Japan, and countries in the Asia–Oceania region for WDS activities, (2) Build and expand the WDS community in the Asia–Oceania region, (3) Exchange experience on successful applications for WDS membership, (4) Encourage former World Data Centres to join ICSU-WDS, (5) Introduce advanced technologies connected with WDS-oriented activities, and (6) Promote WDS activities in support of Future Earth in the Asia–Oceania region. Details will be seen at <http://wdc2.kugi.kyoto-u.ac.jp/wds2017/>.

Keywords: Science Data, ICSU, WDS, Asia-Oceania

## Minna de Honkoku: online transcription project of earthquake-related historical documents

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We have launched Web-based transcription project “Minna de Honkoku” in January, 2017. The URL is <https://honkoku.org/>. “Minna de Honkoku” is also the name for Web application to realize this online transcription project.

The study of historical earthquake is based on historical documents. In Japan, almost all of the documents are written in Kuzushi-ji. Kuzushi-ji is writing style used before ~1900. Since the style is different from that of modern Japanese, transcription is necessary to use the historical documents as data for earthquake research. Catalogs of historical records such as “New collection of materials for the history of Japanese earthquakes” has been published and used for earthquake research. Although huge number of historical documents survives, the majority of the documents left untranscribed.

We loaded 114 historical documents included in the Ishimoto collection in Earthquake Research Institute Library, the University of Tokyo. We planned to start the transcription project with historical document describing past earthquakes on “Minna de Honkoku”, although the application can be used for any type of historical document.

“Minna de Honkoku” consists of viewer of document image and vertical (Japanese-style) editor for transcription. Users can input transcribed texts viewing its image. The ranking of words transcribed is displayed to keep motivation of users. The edit history and online bulletin board are implemented to enhance communication between users. The application is linked to Kuzushi-ji Learning Application, KuLA developed by Osaka University.

Transcription has been completed for 29 documents out of total 114 documents in 3 weeks. Total number of inputted character is about 700,000.

To finish the transcription of 114 earthquake-related historical document is the main goal of the project. In addition, the Web-based project may attract people who are not interested in local earthquake history and natural disaster.

Keywords: Historical earthquake, Digital Humanities, Web application, Crowdsourcing

# みんなで翻刻

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## Future of Open Science foreseen with society: report on a multi-stakeholder workshop in Japan

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It is important that research projects solve social issues, such as global environmental problems, and the falling birthrate, and the aging population. Here, a transdisciplinary approach is needed in which researchers take co-leadership roles to make decisions to solve issues through the process of the co-design of the research agenda, co-production of knowledge, and co-dissemination of the results, based on equal dialogue and deliberation. It is also noted that *pro bonos*, or skilled volunteers providing technical knowledge such as on ICT technologies and social design, have actively been involved in projects driven by social issues. Therefore, it is anticipated that researchers and *pro bonos*—experts in other words—will increasingly strengthen ties with diverse societal stakeholders and that innovative solutions to social issues will be accelerated by promoting open research data to citizen scientists. These actions may contribute towards promoting the movement of open science by paying more attention to collaboration with society. However, few reports focus on practical methods and problems in promoting open science in this direction.

Aware of this situation, a multi-stakeholder workshop was held in Kyoto in January 2017. The workshop aimed at overviewing the current issues of open science from the multifaceted viewpoints of 37 participants, representing natural and social scientists, governmental officials, local municipality officials, industry managers and employees, *pro bonos*, and librarians, through an unconference-style dialogue, during which the topics of group talk were decided by participants *ad hoc*. One of the group talks revealed the necessity to conventionalize open science in each domain of research. Another group talk shed light on two functions of citizen science—the co-development of data infrastructure and the actions for social transformation. Another group pointed out the importance of the capacity building of bridging agents who facilitate the bidirectional interaction of knowledge systems between researcher communities and other societal actors. This paper recommends the actions required to promote open science in the light of social needs, by reorganizing the results of the workshop.

Keywords: Co-design with society, Foresight, Multi-stakeholder workshop, Science and technology policy, Japan

# Research Data Management towards Open Science: An attempt at NIES

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The open science movement is picking up steam worldwide recently. Opening access to journal articles has been a hot topic in open science for about a couple of decades, but opening access to research data (open data) is another critical component of open science. Open data enables a wider group of researchers to build upon existing knowledge by reusing data in novel ways, resulting in increased citations and opportunities for collaboration. However, except some disciplines that already have a culture of sharing research data at least within the communities, appropriate policies and standards for research data management are not consolidated.

National Institute for Environmental Studies (NIES) has recently started to take action on this issue. It started by request from some researchers about minting Digital Object Identifier (DOI) to the research data, which ended up becoming a member of the Japan Link Center, one of the DOI registration Agencies and started minting DOI to research data since 2016. As the beginning was “bottom-up” rather than “top-down”, it has been “reactive approach” rather than “proactive approach”. A working group for promoting open science has been officially formed in 2017, in order to discuss about the institutional repository, data management policies of the institute.

It is not easy to promote open science as an institute though. There are various disciplines in environmental research and in some disciplines, majority of researchers are still reluctant to make their research data publicly available. Resources (both money and human) available for data management is very limited as well. We will present the situation of our attempts to promote open science and discuss about existing issues as a case study of a research institute.

Keywords: Open Science, Open data, Research data management

## On recognition of "primary data" producers through DOI minted to "secondary" data (derived from primary data)

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In specific scientific disciplines (e.g., Earth and Planetary Sciences), some studies are conducted based on data directly retrieved from experiments, observations, and/or simulation, etc. (hereinafter "primary" data or PD), while there are other studies based on data generated from compilation and/or further data processing of PD (hereinafter "secondary" data or SD). SD is sometimes generated from processing multiple PD products (e.g., at different geographical locations, at different time, at different observational techniques/conditions and so on). In a research field where SD is more popularly used, the current data-DOI mechanism may not be sufficient in supporting data producers to keep sustainability of their data creation/curation/management works of PDs, because it is often difficult to ensure they receive proper recognition (and with it, enhanced reputation) even when SD generated from their PD products are used frequently and correctly cited in a number of research papers. In this paper, we attempt to focus on this difficulty for PD producers and we propose a revision in a metadata schema that enables the PD producers' work is appropriately recognized.

Keywords: Open Science, DOI, Secondary data