Japan Geoscience Union Meeting 2013
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U02-P01 会場:コンベンションホール 時間:5 月 20 日 18:15-19:30

データ統合解析システム (DIAS) による統合的流域管理のプロトタイピング
Prototyping Integrated River Basin Management Based on the Data Integration and Analysis System (DIAS)

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水循環は気候システムにとって、また人間が社会的生活を営むための管理システムにとって重要な要素である。気候システムにおいて、水循環の極端事象が生じると洪水や渇水が生じ、社会は人的・経済的に大きなダメージを受ける。同時に、水循環は生物多様性・生態系、農業・食料、健康、エネルギーにおいても、自然システムとしての気候と管理システムとしての水資源管理と密接に関連している。さらには土地利用や森林破壊との関連において、炭素循環とも不可分である。地球観測、予測、データ統合・解析、管理システム、教育システムを連携させ、分野を超えて情報・知の統合化を進めることによって、レジリエントな統合的な流域管理のプロトタイプを開発することが肝要である。

キーワード: 水循環, 河川流域, レジリエンス, 地球観測, データ統合
Keywords: water cycle, river basin, resilience, Earth observation, data integration

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DIAS のデータ分散型システム「CEOS 水ポータル」について
CEOS Water Portal, one of the DIAS distributed data systems

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CEOS 水ポータルは DIAS のデータ分散型システムの一つであり、自身ではデータを所持せず、ユーザ要求に従いデータセンターからのデータ取得・切り出しを行い、ユーザがデータをダウンロードしたり画像として確認することを可能とするシステムである。システム本体は東京にあるが、データは東京 (衛星データ)、米国（地上観測データ)、ドイツ（モデルデータ）等のデータセンターに分散している。

本システムは、ユーザを実務者（河川管理者等）にまで広げ、以下の例のように研究者と実務者間のコミュニケーション促進の一助となることを目指している。

(1) 研究者がモデル計算のためのデータを本ポータルから取得
(2) 研究者がモデル計算を実施
(3) 研究者が解析結果をユースケースとしてシステムに登録
(4) 実務者が本システムにアクセスしてユースケースを参照

本システムは http://waterportal.ceos.org/にてアクセス可能であり、ポスターセッションのなかでデモによりポータルの利用事例等を紹介する。

キーワード: 地球観測衛星委員会, 水ポータル, 衛星データ, 現地観測データ, モデル出力データ, 分散型システム
Keywords: CEOS, Water Portal, DIAS, Satellite data, In-situ data, Model output data

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国立環境研究所における地球環境データベースプロジェクトの概要とそのDIAS/GRENEへの貢献
A Global Environmental Database Project at the National Institute for Environmental Studies and its contribution to DIAS

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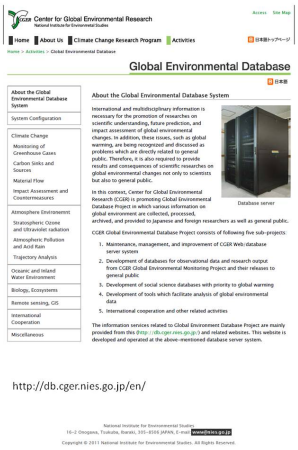
我々、国立環境研究所・地球環境研究センター・地球環境データベース推進室では、2000 年初頭から地球環境に関連した様々なトピックに関連したデータベースの構築とデータ提供を行ってきている。我々の業務は、以下の 5 つに分類される。1) データを提供するデータベースサーバーの構築と維持・運用・更新。2) 我々の研究所の様々な地球環境モニタリングプロジェクトで得られたデータの、一般利用者及び科学者への提供。3) 地球温暖化に関連した社会環境科学データーベースの構築とデータ提供。4) 地球環境データを用いた解析に用いる、様々な解析ツールの開発。5) データベースに関連した国際協力体制の構築。

現在、我々は以下に述べるようなデータベースを運用し、データ提供を行っている（カッコ内の数字は、データベースの件数）。A) 地球温暖化に関連したデータベース：温室効果ガス観測データ関連（7）、二酸化炭素の吸収量・放出量関連（8）、マテリアルフロー関連（10）、地球温暖化の影響と対策関係（3）。B) 大気環境に関連したデータベース：成層圏オゾン層・UV 関連（6）、大気質・酸性雨関連（10）、粒跡線解析関連（1）。C) 湖沼・海洋環境に関連したデータベース（8）。D) 生物に関連したデータベース（3）。E) 衛星リモートセンシング・GIS に関連したデータベース（7）。F) 国際協力に関連したデータベース（7）。G) その他のデータベース（6）。

これら、国立環境研究所・地球環境研究センターが管理するデータベースの概要と将来計画、また 2011 年度から始まった、DIAS/GRENE プロジェクトへの貢献内容について発表する。

キーワード: データベース, 地球環境, 地球温暖化, 気候変動, DIAS, GRENE
Keywords: database, global environment, global warming, climate change, DIAS, GRENE



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FORMOSAT-3/COSMIC Temperature in the Middle Atmosphere - Comparison with SABER & MLS Temperatures and Reanalyses Data
FORMOSAT-3/COSMIC Temperature in the Middle Atmosphere - Comparison with SABER & MLS Temperatures and Reanalyses Data

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GPS radio occultations by FORMOSAT-3/COSMIC constellation of micro-satellites provide refractivity profiles, which are processed real-time by the COSMIC Data Analysis and Archive Center (CDAAC) at the University Corporation for Atmospheric Research (UCAR) to give profiles of temperature and water vapour in the lower atmosphere and electron density in the upper atmosphere. The 'atmprf', i.e., atmospheric profile, product gives temperature from surface to 0.2 hPa (˜ 60 km). This is a dry temperature data product that does not include relative humidity in the inversion process and hence is reliable in the stratosphere and lower mesosphere from 100 to 0.2 hPa and erroneous in the troposphere (< 100 hPa). For lower atmosphere investigations the 'wetprf' product is available which includes the relative humidity term in the data inversion process. In the current study we compare the COSMIC 'atmprf' data with other satellite temperatures (SABER/TIMED and MLS/Aura) from 50 to 0.2 hPa and reanalyses outputs (NCEP, ERA-Interim, and UKMO) at 100, 10, 1 and 0.5 hPa pressure levels. Temperature differences between seasonal medians in different latitude regions show that the COSMIC temperatures are greater than SABER temperatures by 2-3 K in the lower altitudes (> ˜5 hPa) and lower by 5-6 K at higher altitudes (< ˜1 hPa). From 5 to 1 hPa the differences change from negative to positive. This pattern is very systematic in all latitude regions and during all seasons. On the other hand, differences between COSMIC and MLS median temperatures are very small below ˜0.5 hPa and oscillate between +/- 1 K. Above ˜0.5 hPa the COSMIC temperatures are greater by 7-8 K. When compared to reanalyses outputs, COSMIC seasonal means match NCEP and ECMWF seasonal mean temperatures very well, especially at 100 and 10 hPa. The global differences are in between +/- 1 K at 100 hPa and +/- 2 K at 10 hPa. At 1 hPa the differences between COSMIC and ECMWF are greater, especially at high latitudes. On the other hand COSMIC and UKMO seasonal mean temperatures do not agree with each other except during summer and winter at lower altitudes where the differences are in between +/- 2 K. We thus conclude from this study that COSMIC temperatures obtained from radio occultations of GPS are of good quality and match very well with other satellite temperatures retrieved from limb emission measurements and also reanalyses outputs. The COSMIC mission can thus provide more data at greater temporal and spatial resolutions for further studies and investigations of the middle atmosphere. We take this opportunity to introduce this database to the middle atmosphere community for investigating the various geophysical processes in the stratosphere, stratopause, and lower mesosphere. We believe that this database would be extremely useful in investigating the planetary waves, tides, and gravity waves, and phenomenon like the sudden stratospheric warmings, double stratopause, two-way coupling of the troposphere-stratosphere-troposphere (by merging with the 'wetprf' dataset), and its effect on weather and climate, etc.

キーワード: FORMOSAT-3/COSMIC, Middle Atmosphere, GPS RO, Data Validation
Keywords: FORMOSAT-3/COSMIC, Middle Atmosphere, GPS RO, Data Validation

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The IUGONET project and its international cooperation on development of metadata database for upper atmospheric study

The IUGONET project and its international cooperation on development of metadata database for upper atmospheric study

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The upper atmospheric observational study is the area which institutional and international collaborations are crucially important. In order to investigate the mechanism of long-term variations in the upper atmosphere, we need to combine various types of in-situ observations and to accelerate data exchange. The Japanese Inter-university Upper atmosphere Global Observation NETwork project (2009?2015), IUGONET, is an inter-university program by the National Institute of Polar Research (NIPR), Tohoku University, Nagoya University, Kyoto University, and Kyushu University to build a database of metadata for ground-based observations of the upper atmosphere. The IUGONET institutions have been archiving observed data by radars, magnetometers, photometers, radio telescopes, helioscopes, etc. in various altitude layers from the Earth's surface to the Sun. The IUGONET has been developing systems for searching metadata of these observational data, and the metadata database (MDB) has already been operating since 2011. It adopts DSPACE system for registering metadata, and it uses an extension of the SPASE data model of describing metadata, which is widely used format in the upper atmospheric society including that in USA. Hence, these systems can be extended to incorporate other formatted data which are used in the STP community, and we are incorporating the metadata of the data obtained by the cooperative institutions such as NAOJ, NICT and Kakioka Magnetic Observatory of JMA.

The European Union project ESPAS (2011?2015) has the same scientific objects with IUGONET, namely it aims to provide an e-science infrastructure for the retrieval and access to space weather relevant data, information and value added services. It integrates 22 partners in European countries. The ESPAS also plans to adopt SPASE model for defining their metadata, but search system is different. Namely, in spite of the similarity of the data model, basic system ideas and techniques of the system and web portal are different between IUGONET and ESPAS. In order to connect the two systems/databases, we are planning to take an ontological method. The SPASE keyword vocabulary, derived from the SPASE data model shall be used as standard for the description of near-earth and space data content and context. The SPASE keyword vocabulary is modeled as Simple Knowledge Organizing System (SKOS) ontology. The SPASE keyword vocabulary also can be reused in domain-related but also cross-domain projects. The implementation of the vocabulary as ontology enables the direct integration into semantic web based structures and applications, such as linked data and the new Information System and Data Center (ISDC) data management system.

Keywords: database, metadata, atmosphere, earth science, international collaboration

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IUGONET プロジェクトで開発された解析ソフトウェア
Data analysis software developed by the IUGONET project

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The Inter-university Upper atmosphere Global Observation NETwork, IUGONET, is an inter-university project by the National Institute of Polar Research, Tohoku University, Nagoya University, Kyoto University, and Kyushu University to build the infrastructure to access, visualize, and analyze the upper atmospheric data accumulated by the five institutions. In this presentation we introduce the data analysis software, UDAS (iUgonet Data Analysis Software), developed by the IUGONET project.

It is essential to comprehensively analyze various kinds of observational data to clarify the mechanism of long-term variations in the upper atmosphere. However, the observational data are individually archived at each institution and the file format of the data is usually different from each other. Since it is difficult to unify the file format because of a variety of data type and limited human resources, we developed data analysis software that can handle the various file formats. UDAS is a plug-in software of TDAS (THEMIS Data Analysis Software suite) that is written in IDL (Interactive Data Language). Once the data providers make the procedures for loading their data, UDAS can download the data files onto the user's computer through the internet and load variables to the IDL workspace. Furthermore, UDAS provides GUI for beginners of IDL. The formal version of UDAS has been released at the IUGONET website in February, 2012.

キーワード: メタデータ, 超高層大気, 長期変動, 解析ソフトウェア, データベース
Keywords: metadata, upper atomosphere, long-term variation, analysis software, database

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Database of optical and radio wave observation network of the Tohoku University
Database of optical and radio wave observation network of the Tohoku University

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Planetary Plasma and Atmospheric Research Center (PPARC) of the Tohoku University is now in progress to build a upper atmosphere, planetary, and space physics database under collaboration with the Inter-university Upper atmosphere Global Observation NETwork (IUGONET). The core data of the database are planetary and solar radio observation by Iitate Planetary Radio Telescope (IPRT) and Jupiter/galaxy decameter radio receiver working in Iitate observatory, that is one of the observatory of Tohoku University. Recently, development of database of LF/VLF wave observation at Athabasca, Ny-Alesund, and Asia VLF observation network (AVON) are undergoing under collaboration with Chiba University. In the presentation, we will introduce the observations of solar radio burst with high time resolution using the AMATERAS spectrometer of IPRT, as well as lightning and precipitation of high energy electrons into the atmosphere observed by LF/VLF wave. We will also introduce the optical observation of auroral image and geomagnetic data observed in Alaska.

キーワード: データベース, 超高層大気, 電波観測, 光学観測
Keywords: database, upper atmosphere, radio observation, optical observation