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Distribution of polar upper atmospheric data and promotion of polar science by the IUGONET project

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http://www.iugonet.org/

IUGONET project

Schematic View of the IUGONET Project Observational Data Collected by the IUGONET Institutes

IS radar (EISC

aurora imager x

ELF/VLF receive

Syowa Station

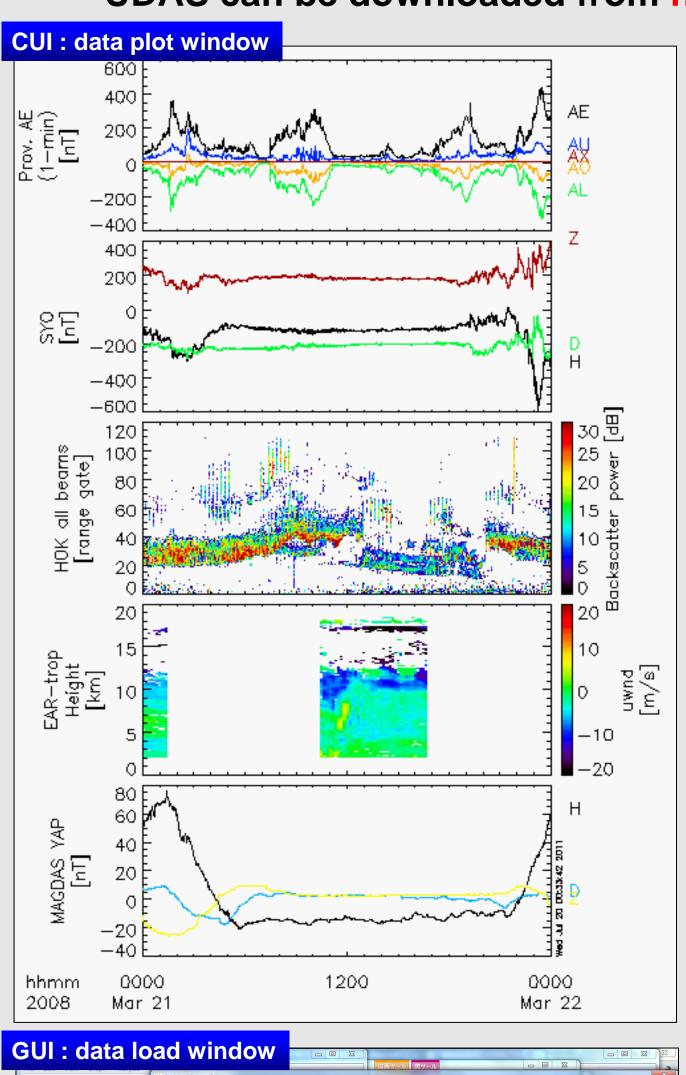
ELF/VLF receiver

SuperDARN radar x

- The data or databases of ground-based observations of the upper atmosphere generally have been maintained and made available to each community research that organization/group conducted the
- Although those data or databases have been well used within certain research communities closely related the observations, they are often difficult to be used by researchers belonging to the other research areas due to lack of information on the data.
- A six-year research project, Inter-university atmosphere Global Observation NETwork (IUGONET) has started in 2009 to overcome such problems in data use by NIPR and 4 universities (Tohoku, Nagoya, Kyoto and Kyushu) in Japan.
- The IUGONET institutes archive a huge amount of and various kinds of ground-based observational data of the upper atmosphere and have formulated a cooperative framework to build the e-infrastructure to facilitate the distribution and use of their data.
- The IUGONET project intends to promote interdisciplinary studies, which would lead to more comprehensive understanding of the mechanism of long-term variations of the upper atmosphere.

Data analysis software - UDAS -

UDAS can be downloaded from http://www.iugonet.org/software.html.



IUGONET tag

<mark>list of downloaded data</mark>

- UDAS is written in IDL (Interactive Data Language), which is widely used in the solar and terrestrial physics. We are developing the software on the basis of TDAS (THEMIS Data Analysis Software suite). UDAS is released as a plug-in software of TDAS to handle data **IUGONET** provided from universities/institutes.
- TDAS contains a lot of useful functions to enable users to download, visualize, and analyze various kinds of data. It is easy to make multiple plots of time series in a single frame to compare various kind of data at one time.
- UDAS accesses IUGONET data through the Internet, and then the data are automatically downloaded onto the user's computer. The users can obtain the data without knowing the location of the file.
- Users don't have to take care of data formats when analyzing the data. The data downloaded and plots created can be exported to a variety of data format (ASCII, PNG, JPEG, PS, EPS, etc.).
- GUI (Graphical User Interface) as well as CUI (Character User Interface) is available so that even users who are not familiar with the data can readily visualize and analyze them.

Metadata database

Browse Service

Browse Service

UDAS 👑

Go to metadata

details

ist of data

he user is

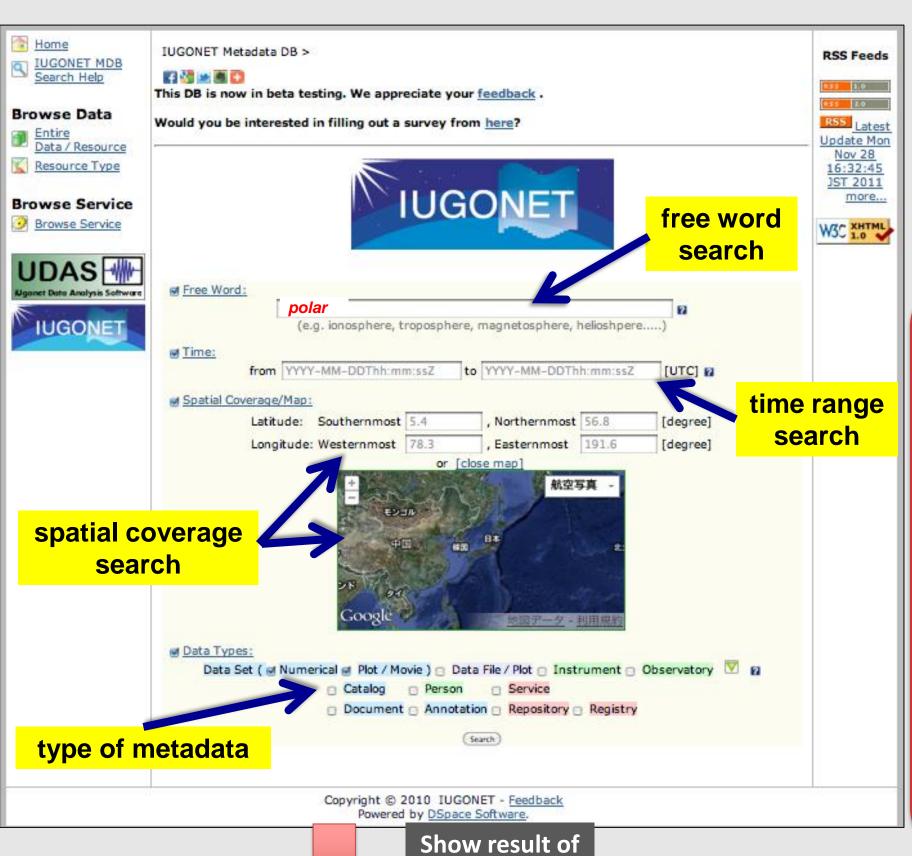
at Tromso, Norway.

The IUGONET metadata database is available at http://search.iugonet.org/iugonet/.

MAGDAS magnetometer

FM - CW radar

Magnetic Equator



data search

ate magnetometer at Syowa Station, Antarctica. The data is originally meas

Jump to data site

Auroral image in the JPEG format taken by the Color Digital SLR Camera with a fish-eye had Longyearbyen, Svalbard, Norway

ıl SLR Camera at Syowa Stati

All-sky auroral image taken by the Color Digital SLR Camera at Tromso, Norwa

Tromso all-sky camera National Institute of Polar Research

Contact on this page: miyaoka@nipr.ac.jp

Date: Feb. 13, 2012

Hourly animation by clicking the time Daily animation (720*480pix

Auroral image in the JPEG format taken by the Color Digital SLR Camera with

Start Date: 2008-12-26T12:39:10

Start Date: 2003-11-17T20:02:41

Start Date: 2005-09-30T19:14:19

Relative Stop Date: 1 minute ago (-PT1M)

Relative Stop Date: 1996-12-31T23:59:58

.html, http://iugonet0.nipr.ac.jp/data/

Magnetic field data with 1sec resolution from t

Relative Stop Date: 1 minute ago (-PT1M

Relative Stop Date: 1 minute ago (-PT1M)

of metadata registered (as of Feb. 13th, 2012)

(* including metadata of data files)

- The IUGONET project adopted **DSpace** as the metadata database platform. DSpace is an open sourc software widely used by the digital repositories at many academic organizations over the world.
- The metadata are archived in the **IUGONET** common metadata format designed based on the **SPASE** (Space **Physics Archive Search and Extract)** data model with additional small modifications according to characteristics of the ground-based observational data.

All-sky auroral image taken by the Color Digital SLR Camera

spase://IUGONET/DisplayData/NIPR/EISCAT/TRO/CDC/PT30S_jpg

Research with the IUGONET products

• We have started collaborative researches that use various kinds of observational data, including the polar upper atmospheric data, from the IUGONET institutes in order to examine and improve the developed metadata database and data analysis software.

- An example of researches using the observational data in the polar regions provided by NIPR -

Background

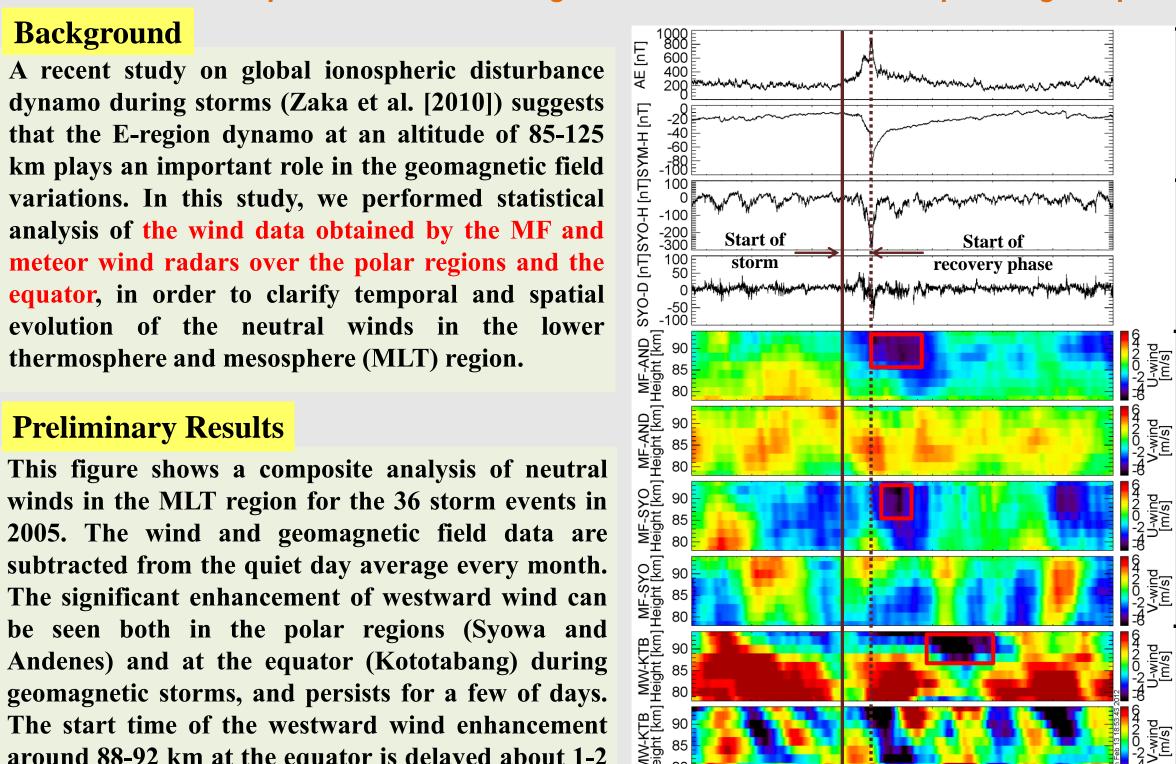
Preliminary Results

choice of

A recent study on global ionospheric disturbance dynamo during storms (Zaka et al. [2010]) suggests that the E-region dynamo at an altitude of 85-125 km plays an important role in the geomagnetic field variations. In this study, we performed statistical analysis of the wind data obtained by the MF and meteor wind radars over the polar regions and the equator, in order to clarify temporal and spatial evolution of the neutral winds in the lower thermosphere and mesosphere (MLT) region.

This figure shows a composite analysis of neutral

(S) S...
(S) S...
(D) M...
(E) M...
(D) M...
(D) II...
(D) II



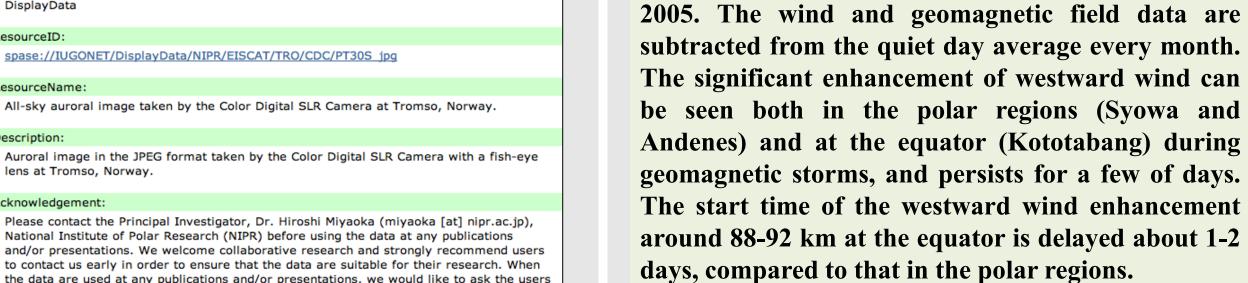
Geomagnetic indices (AE and SYM-H) provided from WDC, **Kyoto Univ.**

Geomagnetic field at Syowa (H and D components) provided from NIPR

MLT wind data at **Andenes and Syowa** in the polar regions

provided from NIPR

MLT wind data at Kototabang in the equatorial region provided from RISH, **Kyoto Univ.**

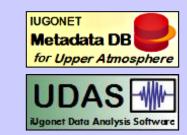


Auroral image in the JPEG format taken by the Color Digital SLR Camera with a fish-eye Please contact the Principal Investigator, Dr. Hiroshi Miyaoka (miyaoka [at] nipr.ac.jp), Institute of Polar Research (NIPR) before using the data at any publications to contact us early in order to ensure that the data are suitable for their research. When the data are used at any publications and/or presentations, we would like to ask the users to acknowledge NIPR and send us one copy of the reprints. An example of the acknowledgement statement is as follows: "Aurora images were provided by National Institute of Polar Research, Japan.'

0: spase://IUGONET/Person/Hiroshi.Miyaoka list of link(s) to 1: spase://IUGONET/Person/Yoshimasa.Tanaka 0: PrincipalInvestigator contact person 1: MetadataContact

- The "search result" shows part of metadata title, description, and access URL (if available) - of data that match input keyword(s), time range, and/or spatial coverage.
- The metadata "title" is a link to the metadata details which include at least link(s) to metadata of contact person responsible to the data.
- The "access URL" leads the user to the web site of the observational database. The user may be able to obtain the data files if they are available online.

- The IUGONET project has been developing the e-infrastructure (metadata database and data analysis software) to facilitate the distribution and use of the ground-based upper atmospheric data provided by the IUGONET institutes.
 - Metadata database : http://search.iugonet.org/iugonet/
 - Data analysis software : http://www.iugonet.org/software.html



• The IUGONET project members has stared collaborative researches to self-evaluate the developed products and to demonstrate how to use them in the actual scientific studies.

Acknowledgement

- * This project is supported by the Special Educational Research Budget (Research Promotion) [FY2009] and the Special Budget (Project) [FY2010 and later years] from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan.
- * We acknowledge the cooperation and generosity of the THEMIS Science Support Team in allowing us to use TDAS for our data analysis software (UDAS). UDAS has been developed in collaboration with the ERG Science Center.