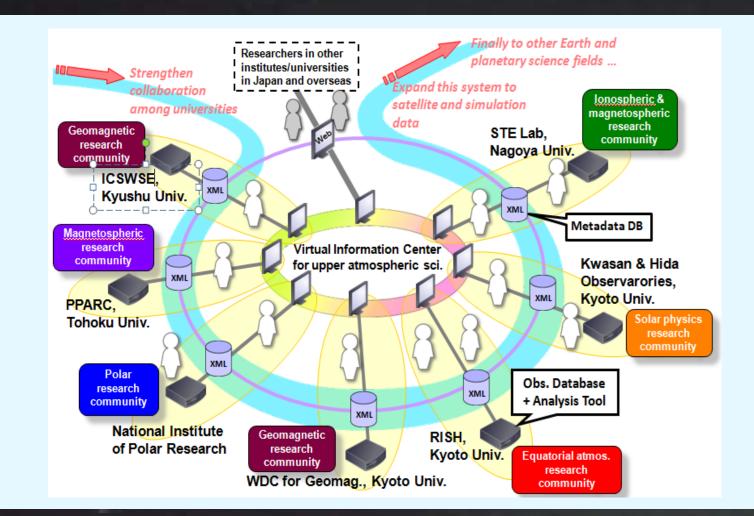
# IUGONET

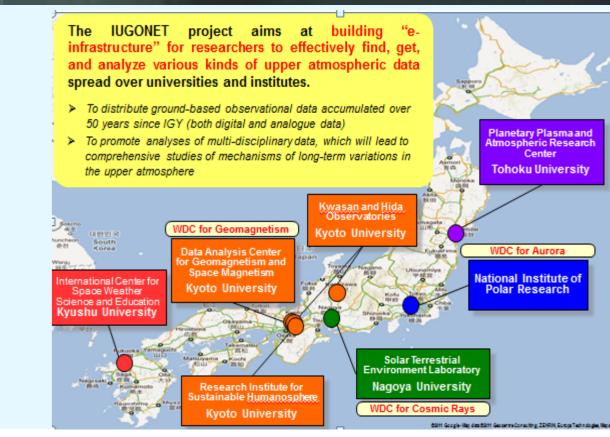
## Inter-university Upper atmosphere **Global Observation NETwork**



<sup>1</sup>Yatagai, A., <sup>1</sup>H. Hayashi, <sup>2</sup>Y. Koyama, <sup>3</sup>T. Hori, <sup>4</sup>Y. Tanaka, <sup>5</sup>S. Abe, <sup>1</sup>A. Shinbori, <sup>3</sup>N. Umemura, <sup>6</sup>S. UeNo, <sup>4</sup>Y. Sato, <sup>7</sup>M. Yagi, and IUGONET team (<sup>1</sup>RISH, Kyoto Univ., <sup>2</sup>WDC for Geomag., Kyoto Univ., <sup>3</sup>STE Lab, Nagoya Univ., <sup>4</sup>NIPR, <sup>5</sup>ICSWSE, Kyushu Univ., <sup>6</sup>Kwasan and Hida Obs., Kyoto Univ., <sup>7</sup>PPARC, Tohoku Univ.)

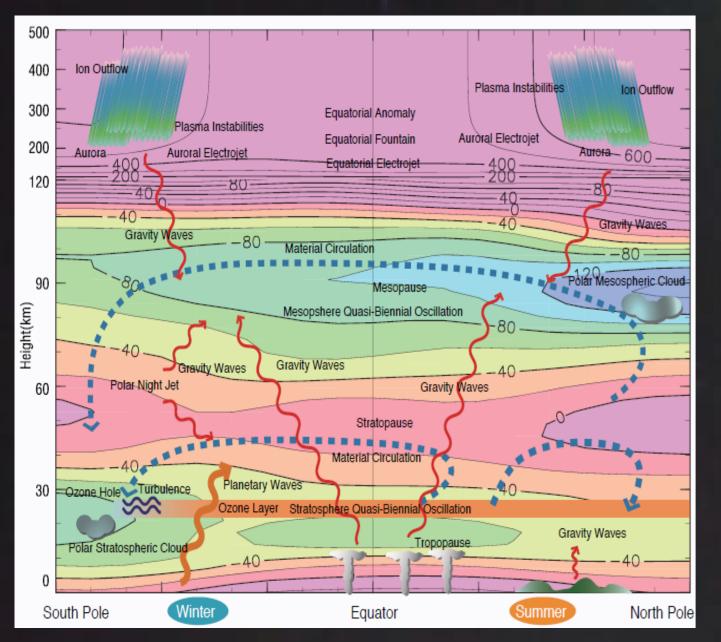


The Inter-university Upper atmosphere Global Observation NETwork (IUGONET) is a Japanese inter-university project for 6 years (FY2009-FY2014) by the National Institute of Polar Research (NIPR), Tohoku University, Nagoya University, Kyoto University, and Kyushu University to build a database of metadata for ground-based observations of the upper atmosphere. The IUGONET institutes/universities have been collecting various types of data by radars, magnetometers, photometers, radio telescopes, helioscopes, etc. at various locations all over the world and at various altitude layers from the Earth's surface to the Sun. The metadata database will be of great help to researchers in efficiently finding and obtaining these observational data spread over the institutes/universities. This should also facilitate synthetic analysis of multi-disciplinary data, which will lead to new types of research in the upper atmosphere. The project has also been developing a software to help researchers download, visualize, and analyze the data provided from the IUGONET institutes/universities.

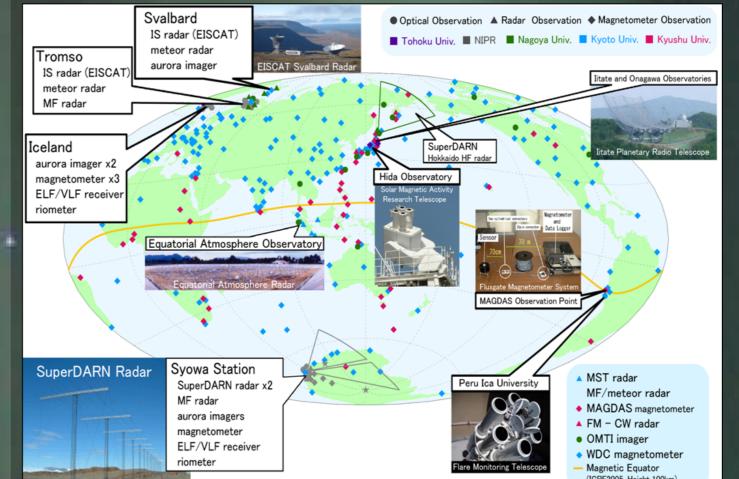


IUGONET website: http://www.iugonet.org/

## **Importance of Upper Atmosphere dataset**

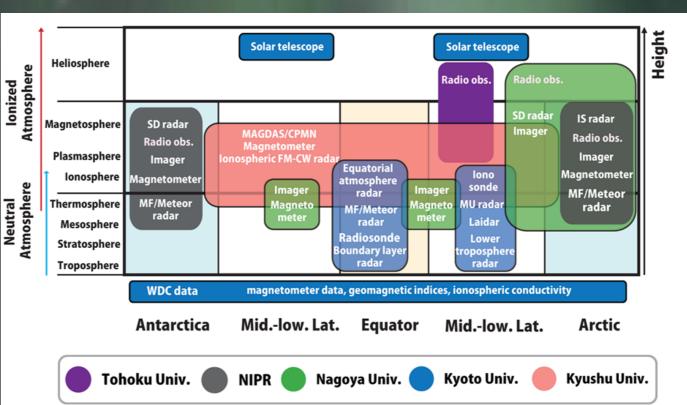


The upper atmosphere is considered a compound system consisting of the mesosphere, thermosphere, ionosphere, and magnetosphere. Although the different atmospheric layers are often referred to as independent regions, they are closely coupled by exchange of materials, momenta, and energies through complicated physical processes, for example, • Energy input from the sun (e.g., ultraviolet radiation and the solar wind, drive convection of both neutral and charged particles, • Momenta and energies from the stratosphere and troposphere injected by atmospheric waves, • Many internal phenomena (e.g., electromagnetic energy transport, plasma convection, chemical reaction).



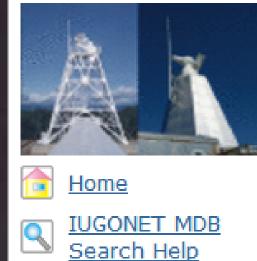
• Optical Observation A Radar Observation A Magnetometer Observation We have various kinds of observational data acquired so far by global observation networks of radars, magnetometers, photometers, radio telescopes, helioscopes, etc. The databases of these ground-based observations, however, have been managed and maintained by each university/institute that conducted the observation. It is often the case that the data have been used by only a very few researchers who were involved in the observation campaign. There is no way for general, potential users to find out these databases due to lack of information. The IUGONET project aims at building a metadata database of the upper atmospheric data acquired by ground-based observations so that people can obtain information of various data from the metadata database. This will promote effective use of the observational data spread across universities and institutes, and then lead to new interdisciplinary, comprehensive studies regarding the upper atmosphere.

Therefore, we need to create integrated and organic links between a variety of ground-based observations made at various locations from the equator to the poles.



## Metadata database (MDDB)

The IUGONET metadata database has been released since last year! It is now available at



#### IUGONET Metadata DB >

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Questionnaire easy feedback or detail survey Number of current metadata 6,414,698

including observatory (652), instrument (708) and data files

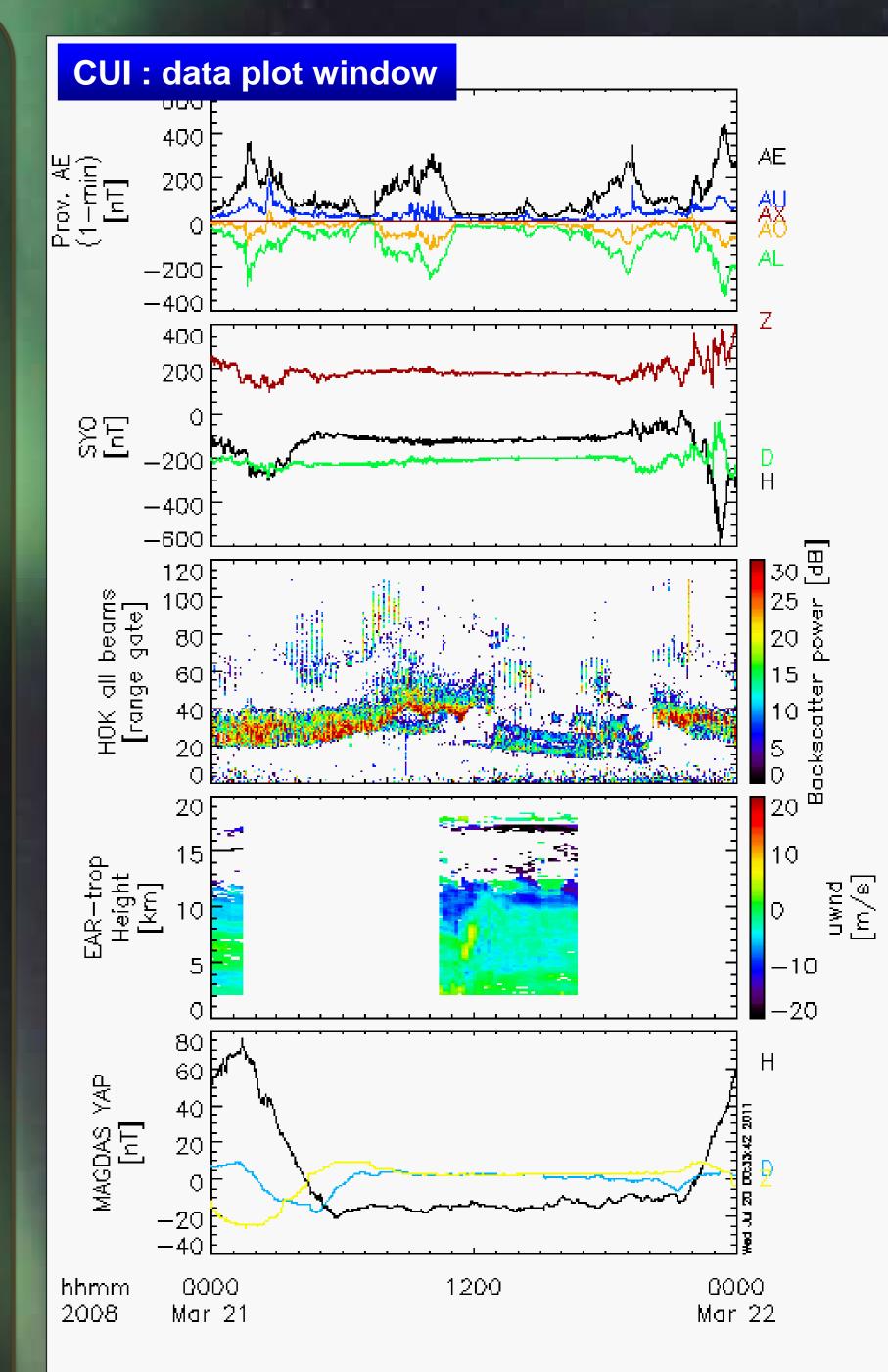
## **IUGONET Data Analysis Software suite (UDAS)**

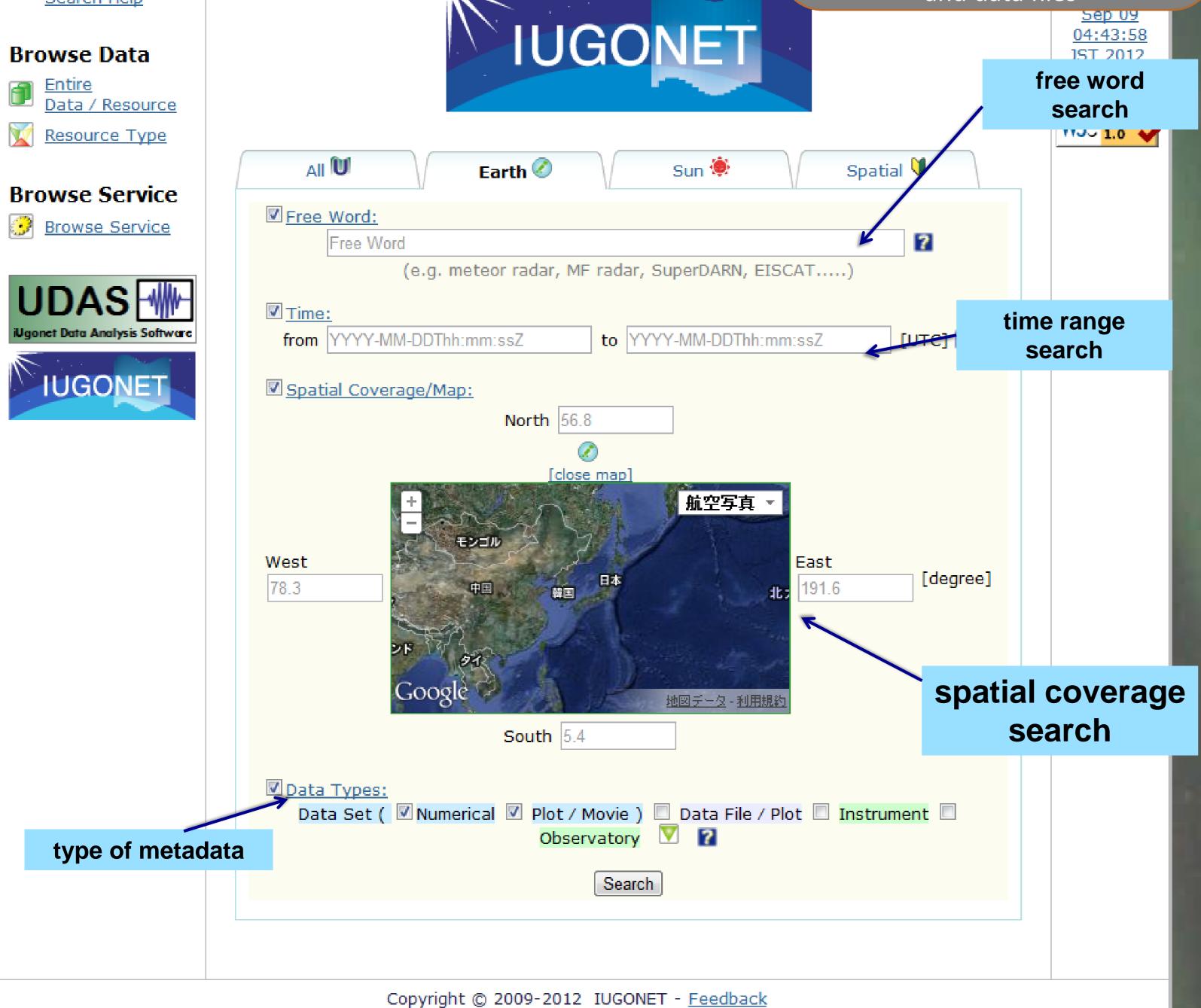
**IUGONET** overcomes data diversity

The official version of the IUGONET data analysis software, named UDAS (currently version 2.00.1), can be downloaded from the project website at http:/

#### • The UDAS is written in IDL

(Interactive Data Language), which is widely used in the fields of solar and terrestrial physics. We are developing the software on the basis of TDAS

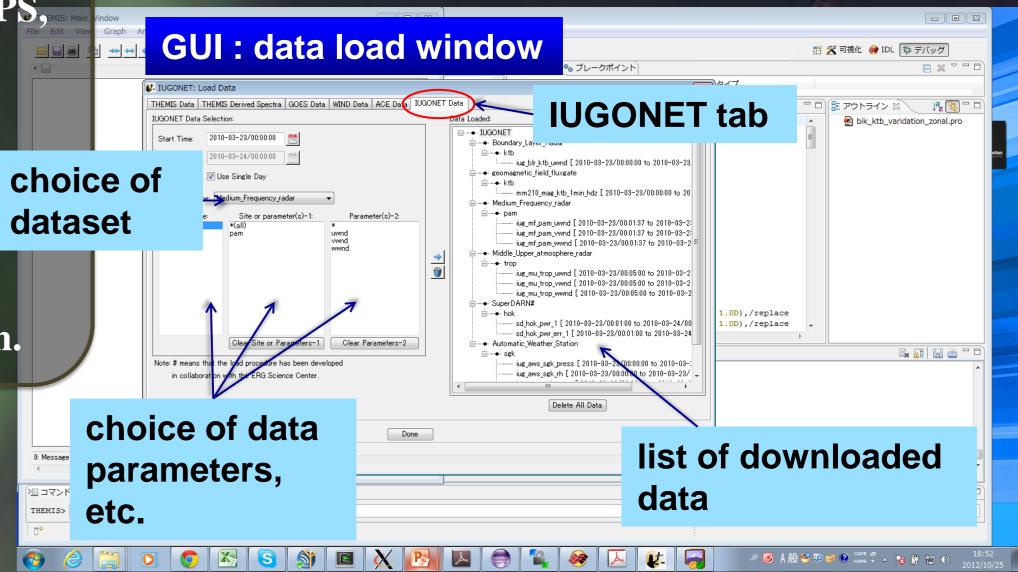




• The IUGONET project adopted

(THEMIS Data Analysis Software suite). The UDAS is distributed as a plug-in software of TDAS to handle data provided from the IUGONET universities/institutes.

- The TDAS already contains a lot of useful functions to enable users to download, visualize, and analyze various kinds of data. It is easy to make stacked plots of time series in order to compare various kind of data at one time.
- The UDAS accesses IUGONET data through the internet, and then the data are automatically downloaded onto the user's computer. Users can get and analyze the data without knowing data file locations.
- Users need not 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



It can provide fundamental functions of registering, of data retrieving, providing and harvesting of metadata written search even in the IUGONET common metadata format. IUGONET MDB Search Results Search Help Browse Data SuperDARN Entire Data / Resource Time from: [UTC] Data Set ( 🗹 Numerical 🗹 Plot / Movie ) 🛽 🛛 Data File / Plot 🔲 Instrument 🔲 Observatory <u>Resource Type</u> Browse Service Results 1-4 of 4. Browse Service Results/Page 10 V | Sort items by Relevance V In order Descending V Sort! UDAS া Go to metadata IUGONE Resource Name details Resource Type Description Association The common time fitacf data of SENSU SuperDARN Syowa South HF radar distributed by E <u>G-SC</u> Common mode data obtained by SENSU SuperDARN Syowa South HF radar. Data files are distributed in the CD F format by ERG-SC. Start Date: 1995-08-01T02:33:22 Relative Stop Date: 7 days ago (-P7D) http://gemsissc.stelab.nagoya-u.ac.jp/erg/, http://scidbase.nipr.ac.jp/modules/metadata/index.php?content i <u>d=107</u> Repository: <u>spase://IUGONET/Repository/STEL/ERG-SC</u> nstrument: <u>spase://IUGONET/Instrument/NIPR/SuperDARN/SYO/HFradar\_SYS</u> <u>The common time fitacf data of SENSU SuperDARN Syowa East HF radar distri</u>buted by E Data Set Common mode data obtained by SENSU SuperDARN Syowa East HF radar. Data files are distributed in the CDF format by ERG-SC. Start Date: 1995-08-01T02:33:22 Relative Stop Date: 7 days ago (-P7D) http://gemsissc.stelab.nagoya-u.ac.jp/erg/, http://scidbase.nipr.ac.jp/modules/metadata/index.php?content <u>d=107</u> list of data the user Repository: <u>spase://IUGONET/Repository/STEL/ERG-SC</u> Instrument: <a href="mailto:spase://IUGONET/Instrument/NIPR/SuperDARN/SYO/HFradar\_SYE">spase://IUGONET/Instrument/NIPR/SuperDARN/SYO/HFradar\_SYE</a>

Show result

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<u>easy feedback</u> or <u>detail survey</u>

database platform. DSpace is a free software widely used by

digital repositories at many universities over the world.

• DSpace consists of PostgreSQL, Tomcat, Lucene, and so on.

#### The common time fitacf data of SENSU SuperDARN Syowa South HF radar distributed by ERG-SC Resource Type

IUGONET Metadata DB > IUGONET > NumericalData > NIPR > SuperDARN > SYO > HFradar SYS :

as the metadata

#### The common time fitacf data of SENSU SuperDARN Syowa South HF radar distributed by ERG-SC

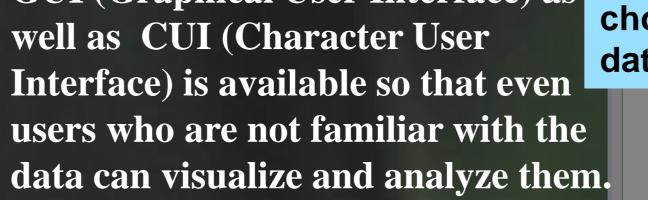
#### Description Common mode data obtained by SENSU SuperDARN Syowa South HF radar. Data files are distributed in the CDF format by ERG-SC.

#### Acknowledgement

Data distributed with this CDF file can be used freely for scientific research. Please note that the data are not fully calibrated and may still contain glitches and errors which could yield scientifically wrong or misleading results. We strongly recommend working directly or checking with the PI (Natsuo Sato, ROIS/NIPR), Co-PI (A. Sessai Yukimatu, ROIS/NIPR) (E-mail: sdsensu [at] uap.nipr.ac.jp) and/or researchers of the other SuperDARN PI groups regarding data accuracy and interpretation. Data users must contact the PI before any form of presentation/publication including any fraction or the entire part of data. Please acknowledge the research grant which enables the construction and operation of the SENSU SuperDARN Syowa HF radars. An example of the acknowledgement statement is as follows: "SENSU SuperDARN Syowa HF radar data were provided by National Institute of Polar Research, Japan. This research was mainly supported by the Research Program of Japanese Antarctic Research Expedition (JARE) of the Ministry of Education, Culture, Sports, Science, and Technology of Japan (MEXT)."

#### list of ReleaseDate 2011-04-01T12:00:00 ExpirationDate link(s) to 2199-12-31T23:59:59 Contac metadata PersonID spase://IUGONET/Person/Natsuo.Sato of contact PrincipalInvestigator person Contact

- The "search result" shows part of metadata - title, description, and access URL if available - of data that match input keyword(s), time range, and 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.



### Acknowledgments

- 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).
- The UDAS has been developed in collaboration with the ERG (Energization and Radiation in Geospace) Science Center.