IUGONET

Metadata DB for Upper Atmosphere

JpGU@Makuhari, Chiba
MTI coupling in Asian sector
PEM08-30
2012/05/22

超高層大気長期変動の全地球ネットワーク観測・研究

Inter-university Upper atmospheric Global Observation NETwork

Upper atmospheric researches using metadata database and data analysis software developed by the IUGONET project

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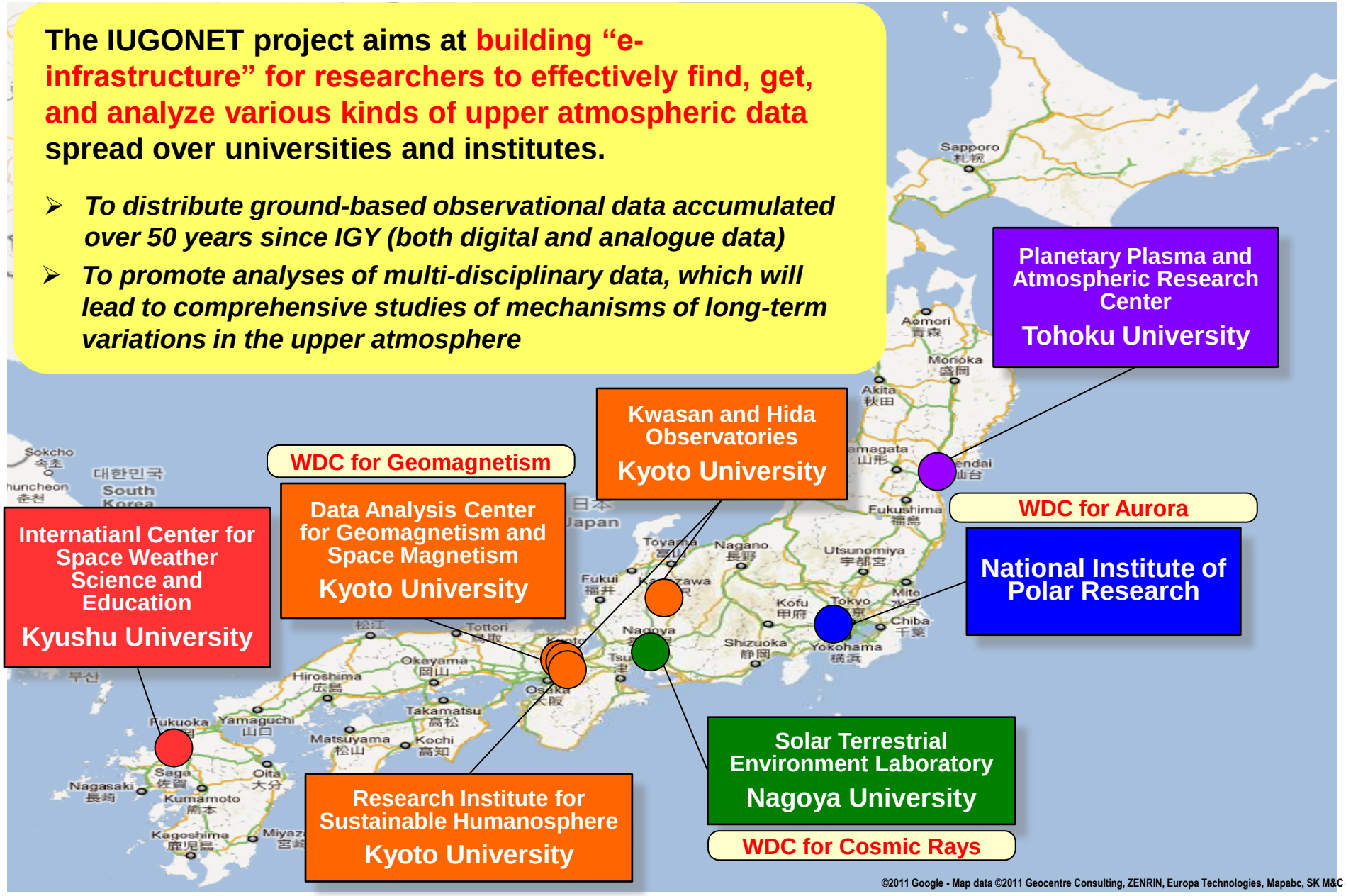
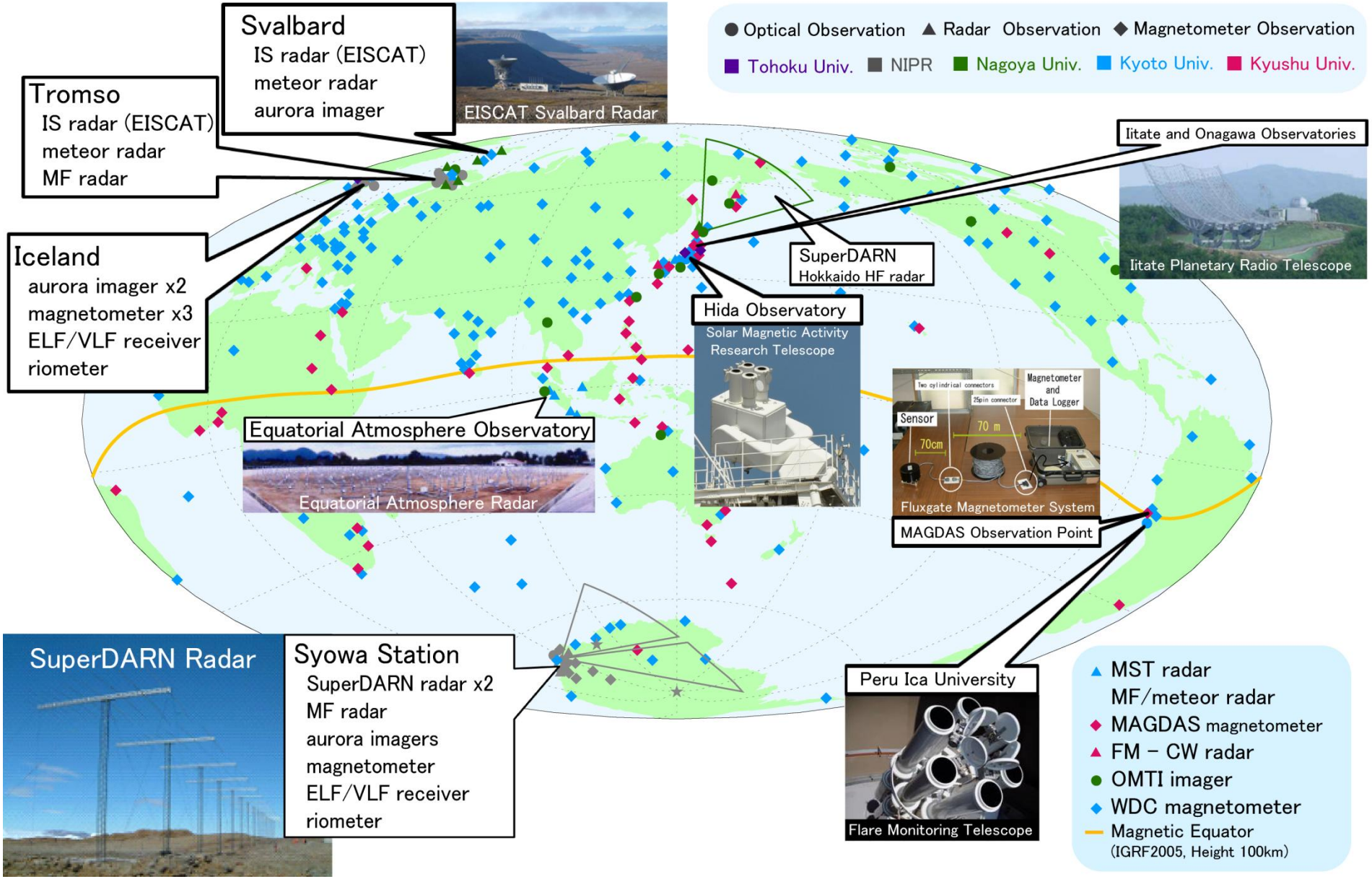
1. Introduction (Objective of the IUGONET project)

The IUGONET project aims at building "e-infrastructure" for researchers to effectively find, get, and analyze various kinds of upper atmospheric data spread over universities and institutes.

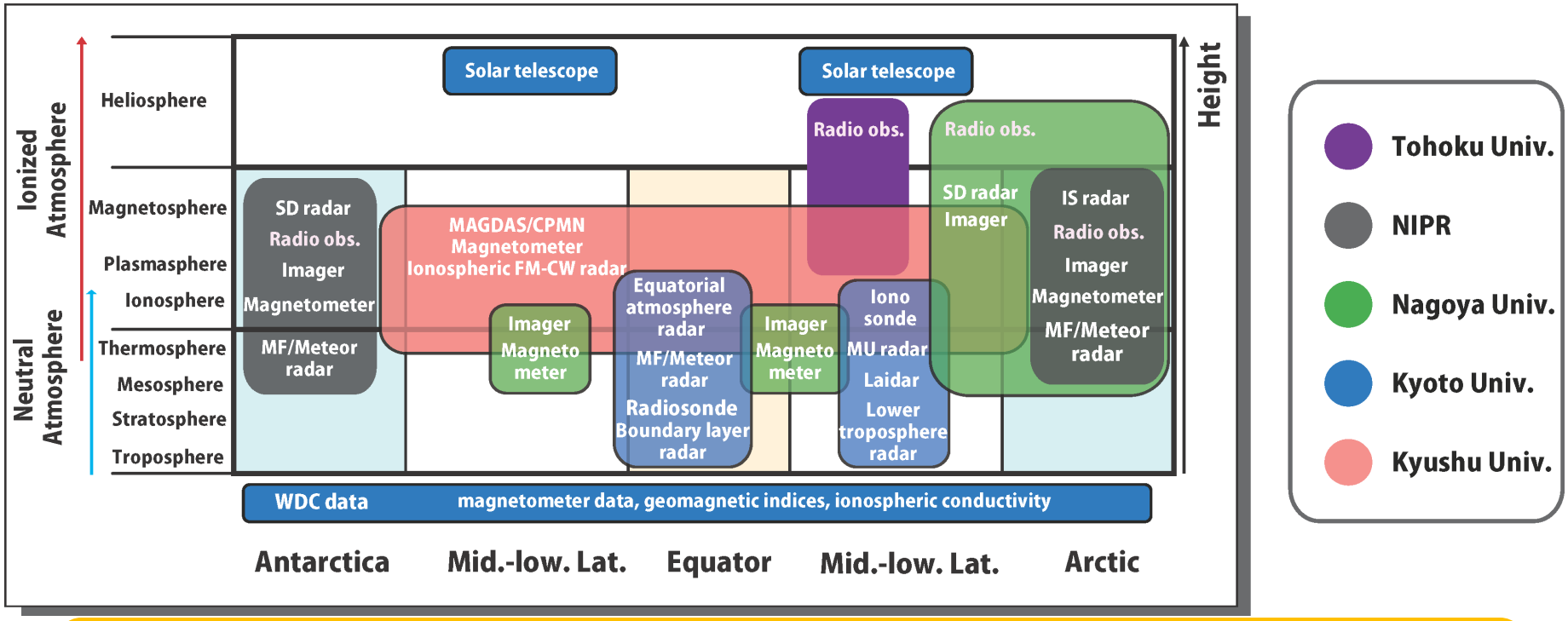
- ***To distribute ground-based observational data accumulated over 50 years since IGY (both digital and analogue data)***
- ***To promote analyses of multi-disciplinary data, which will lead to comprehensive studies of mechanisms of long-term variations in the upper atmosphere***



1. Introduction (IUGONET observation networks)



1. Introduction (Problems of data use)



Various observation parameters (wind, geomagnetic field, aurora, sunspot etc.) taken by various techniques in various time periods at various locations and altitudes

Such observational data not necessarily well used in scientific researches so far

➔ PROBLEMS: databases dispersed, too little info, various data format, etc.

<u>SOLUTIONS</u>

1. Metadata database : to share info of data online and realize cross-search

2. Data analysis software : to help users quickly visualize and analyze data

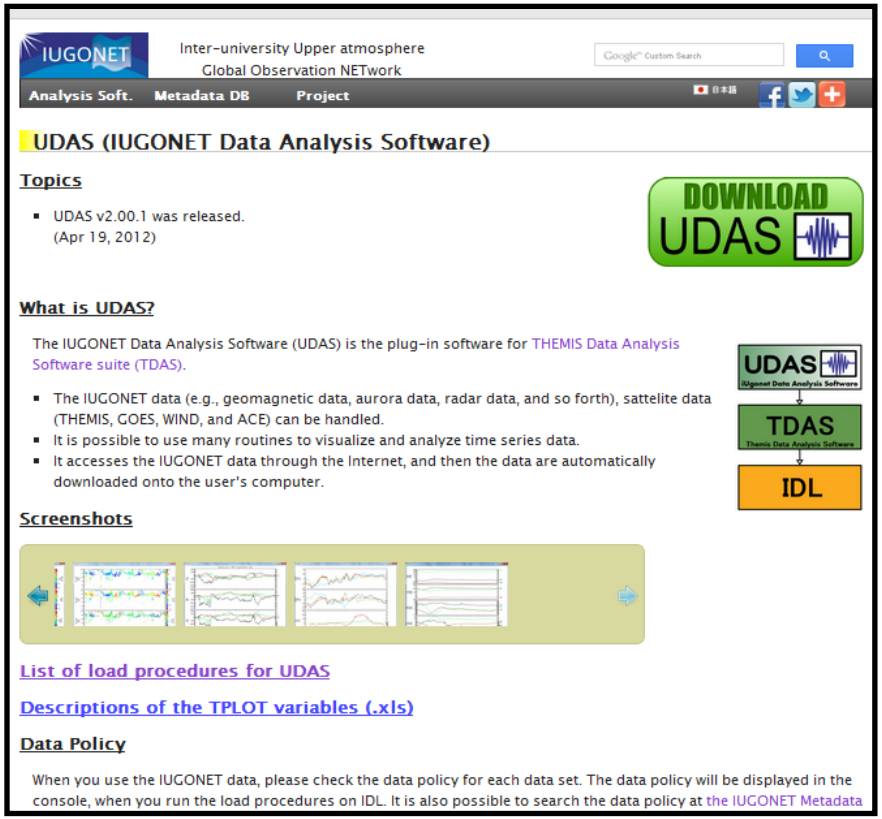
2. Main products by the IUGONET project

1. Metadata database

http://search.iugonet.org/iugonet

2. Data analysis software

http://www.iugonet.org/en/software.html



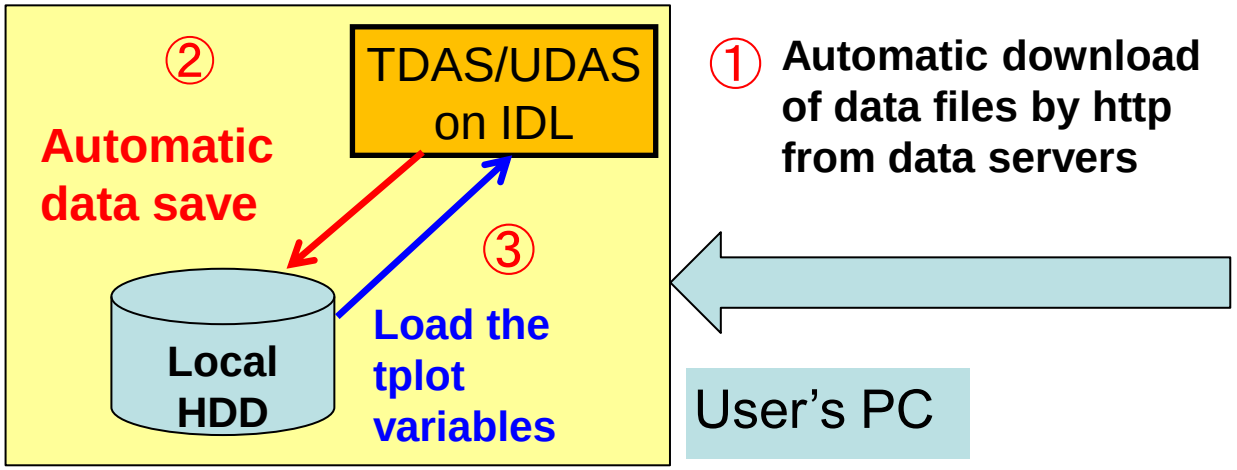
We have already released the IUGONET metadata database and the integrated data analysis software!

3. Development of analysis software

3.1 Characteristics of the UDAS software

UDAS is a plug-in software of TDAS and includes the load procedures for observation data distributed by the IUGONET institutions.

```
> timespan, 'yyyy-mm-dd', 13, /day
> thm_load_○○○
> tplot, △△△
```



Data server

SSL Berkeley
THEMIS, GBO

CDAWeb
OMNI, ACE, Wind, GOES, LANL.

IUGONET
Tohoku U
NIPR
STEL, Nagoya U
Hida Obs., Kyoto U
RISH, Kyoto U
WDC, Kyoto U
SERC, Kyushu U

Users can get and analyze various kinds of observation data without any concerns about data locations and formats.

3. Development of analysis software

3.2 Sample plot using the UDAS software

2011/3/7-16

Geomagnetic field indices

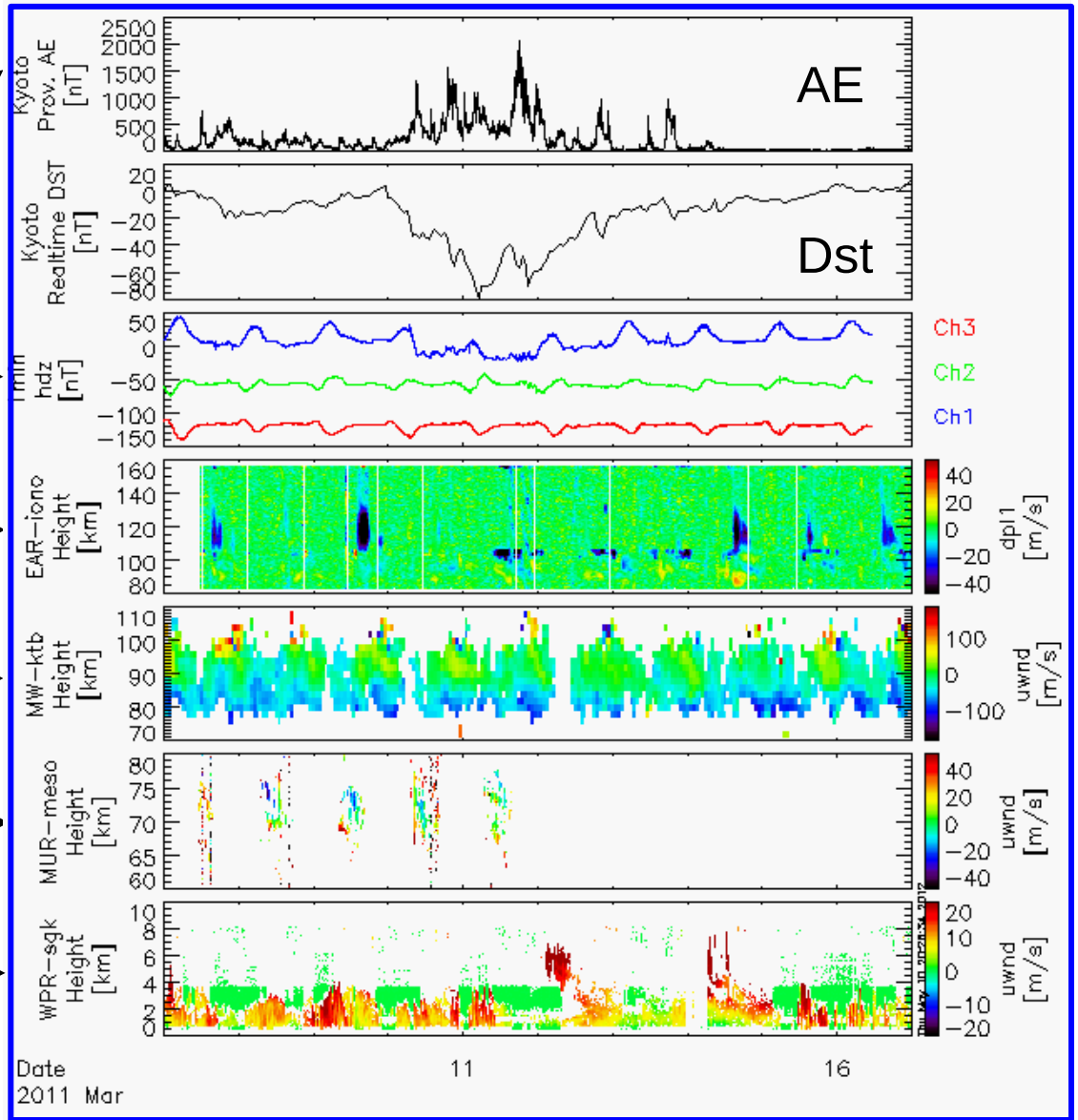
Global magnetometer network data

EAR-FAI

Meteor radar

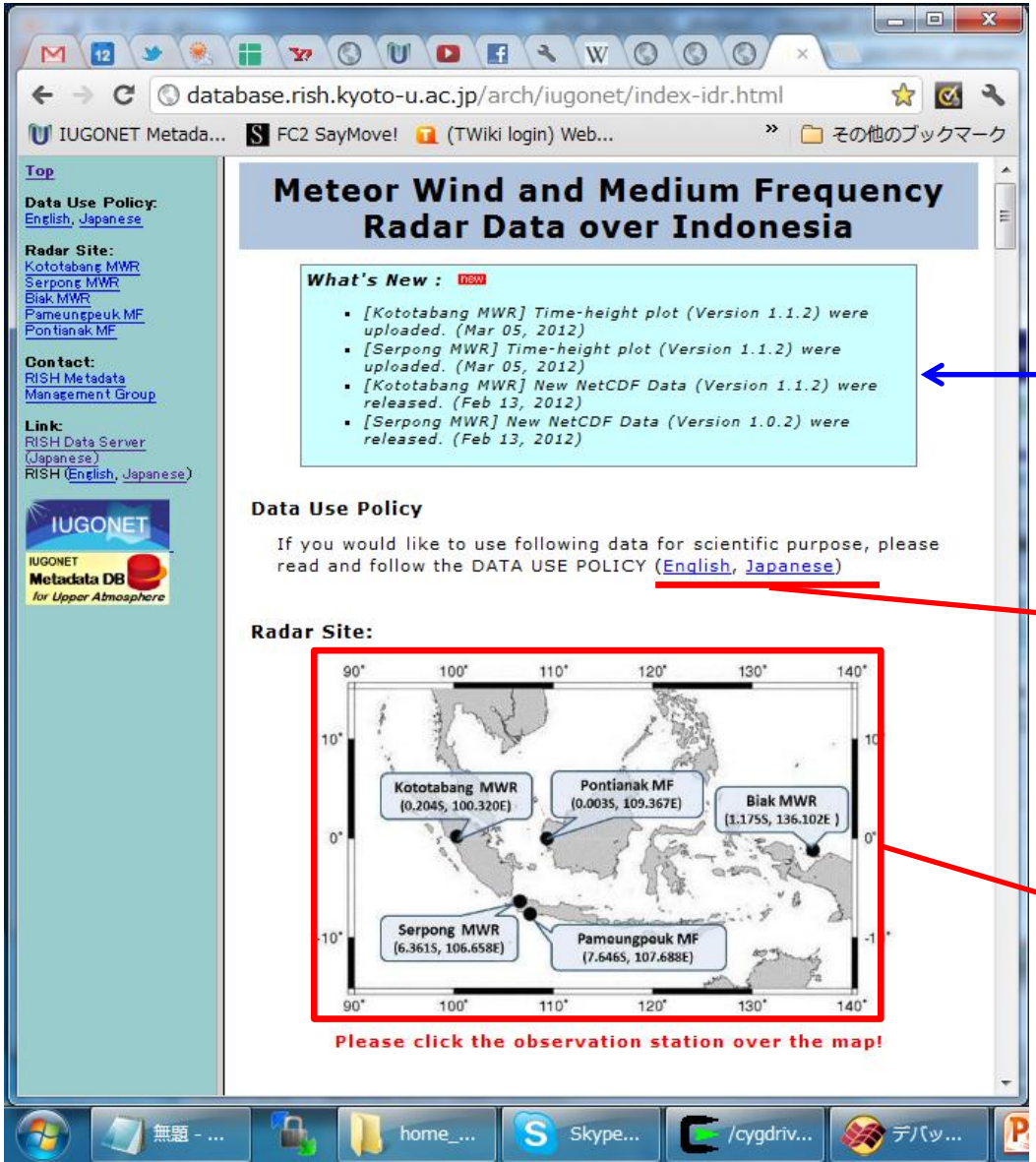
MU mesosphere

LQ-7



4. Database of MF/MW radars in Indonesia

4.1 Webpage of MF/MW radar data in Indonesia



Access URL: http://database.rish.kyoto-u.ac.jp/arch/iugonet/index-idr.html

Information of the latest data

Jump to the detailed data use policy (English, Japanese).
Please read it carefully before you use the radar data.

If you click the observation station shown on the map, you can go to the download page of observation data at the selected station.

4. Database of MF/MW radars in Indonesia

4.2 Category of MF and MW radar data in Indonesia

Serpong MW radar

- **Numerical data** (1992/10-1999/08)
  Wind data (1-day, 1-month files)
  Text, NetCDF
  Resolution :
  2 km, 60 min (-30-30 min)
  4 km, 240 min (-120-120 min)
- **Display data**
  GIF (1-day, 1-month, 1-year)

Kototabang MW radar

- **Numerical data** (2002/11-present)
  Original: Text (1-day file)
  Wind data (1-day, 1-month files)
  Text, NetCDF
  Resolution :
  2 km, 60 min (-30-30, 0-60 min)
  4 km, 60 min (-30-30, 0-60 min)
- **Display data**
  GIF (1-day, 1-month, 1-year)

Pameungpeuk MF radar

- **Numerical data** (2004/03-present)
  Binary (1-day file)
  NetCDF (1-day file)

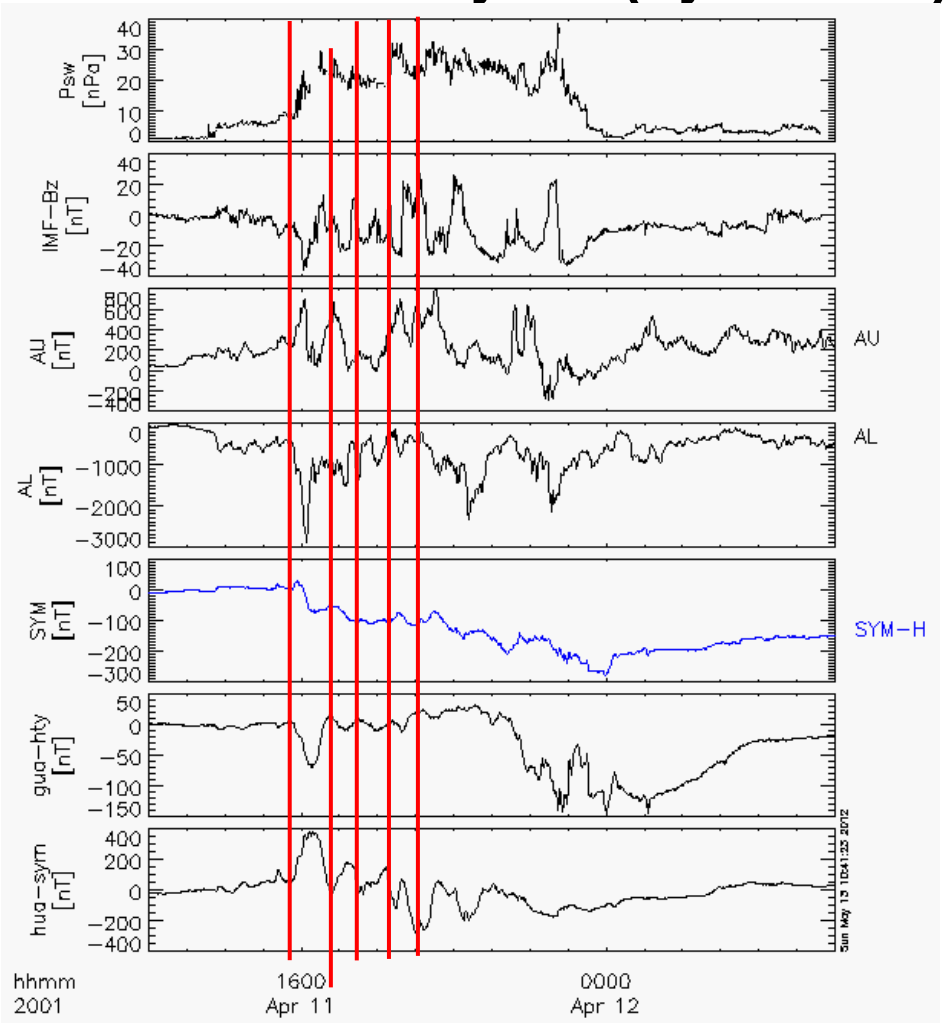
Pontianak MF radar

- **Display data** (2010/02-2011/05)
  PNG (1-day and 1-month files)

5. Example of upper atmospheric researches

- Global geomagnetic field variation and ionospheric disturbance dynamo during geomagnetic storms.

Leader: Dr. Hayashi (Kyoto Univ.) **Joint research program of NIPR**



[Purpose of this study]

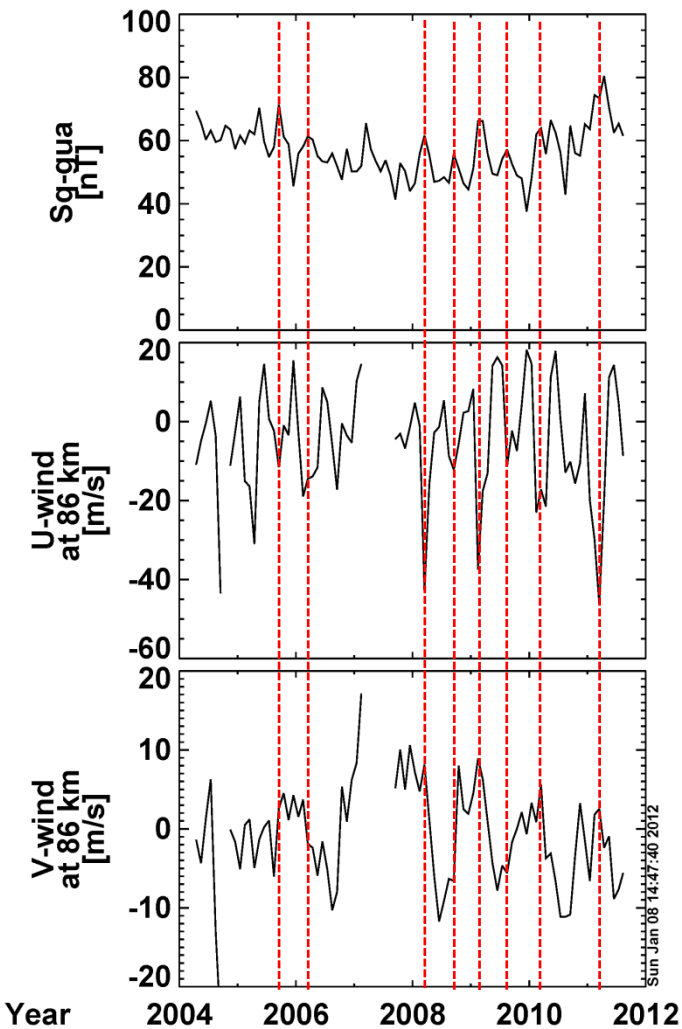
To clarify the origin of global magnetic field variations during geomagnetic storms using solar wind and magnetic field observations.

In this case, eastward and westward equatorial electrojets are enhanced on the dayside and nightside, respectively, at the onset of geomagnetic storm.

5. Example of upper atmospheric researches

- Long-term variation of upper atmosphere as seen in the amp litude of solar quiet (Sq) daily variation.

Leader: Dr. Shinbori (Kyoto Univ.) Joint research program of STEL



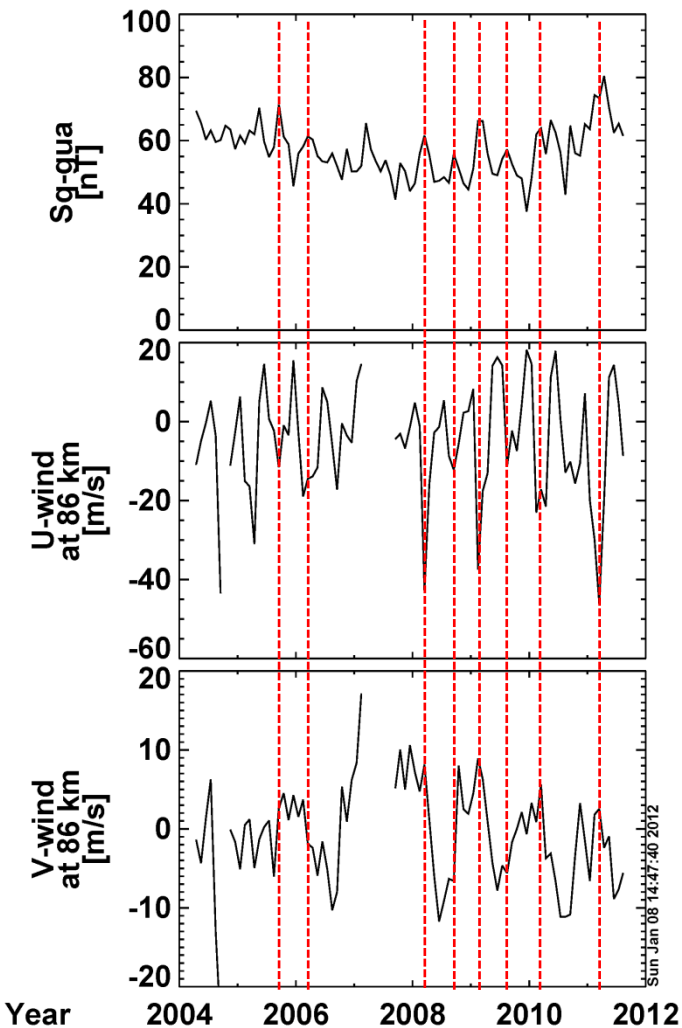
[Purpose of this study]

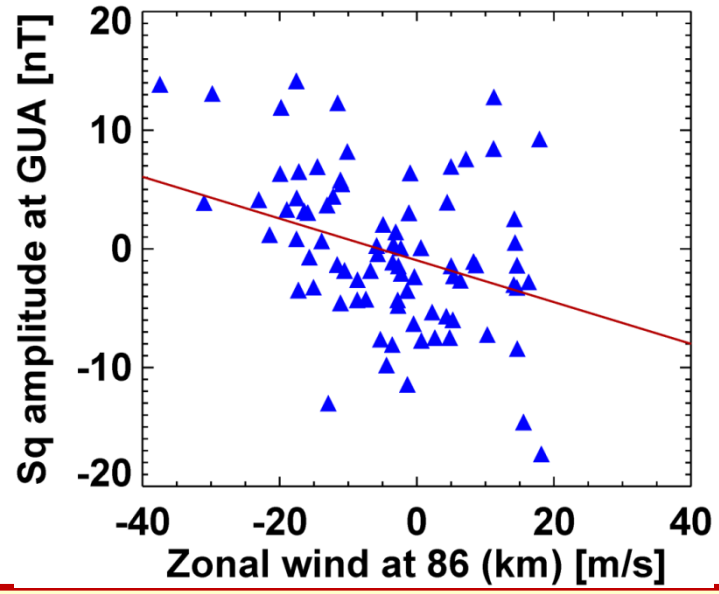
To clarify the origin of long-term variation of Sq amplitude from correlation analysis between geomagnetic field and wind in the MLT region.

5. Example of upper atmospheric researches

- Long-term variation of upper atmosphere as seen in the amp litude of solar quiet (Sq) daily variation.

Leader: Dr. Shinbori (Kyoto Univ.) Joint research program of STEL





The Sq amplitude tends to enhance when zonal wind is directed westward.

This result suggests that the MLT wind contributes to ionospheric dynamo which produces ground magnetic field variations.

6. Summary

- **The IUGONET project (http://www.iugonet.org) builds metadata database and data analysis software (UDAS) to promote effective use of upper atmospheric data taken by various ground-based observations.**
- **UDAS is a plug-in software of TDAS and provides the load procedures for the various ground-based observational data distributed by each institution in the IUGONET project.**
- **We promote long-term variation of upper atmosphere using various kinds of observation data in order to evaluate a capability of our developed products.**
- **The IUGONET products have been released!**

Metadata database : **http://search.iugonet.org/iugonet/**

Analysis software : **http://www.iugonet.org/en/software.html**

We welcome your feedback