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<th>Title</th>
<th>Inter-university Upper atmosphere Global Observation NETwork (IUGONET)</th>
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<tr>
<td>Author(s)</td>
<td>HAYASHI, Hiroo; TANAKA, Yoshimasa; HORI, Tomoaki; KOYAMA, Yukinobu; KAGITANI, Masato; SHINBORI, Atsuki; ABE, Shuji; KOUNO, Takahisa; YOSHIDA, Daiki; UENO, Satoru; KANEDA, Naoki; IUGONET project team</td>
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Kyoto University
The IUGONET project - objectives

- Since exchanges of materials, momenta, and energies in the upper atmosphere take place through complicated physical processes at different layers, integrated analysis by using various kinds of observational data is essential for investigating the mechanism of long-term variations in the upper atmosphere.

- However, the databases of such observations have been managed and maintained by each institution that conducted the observations. The data have been used only by a very few researchers who were involved in the observation campaign. There is no way to cross-search these databases due to lack of information on the data.

- The purpose of this project is to build a metadata database (MDB) of the upper atmospheric data acquired by ground-based observations, and then to promote effective use of the observational data spread across universities and institutes, which will lead to new interdisciplinary, comprehensive studies regarding the upper atmosphere.

Project timeline

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Problem of data use

- There is even more work to be done in the other disciplinary data due to lack of information.

Solution by metadata

- Easy to search various kinds of data from other observational data.

Metadata format

- IUGONET common metadata format = SPASE + modifications

Inter-university collaboration

- A six-year research project, Inter-university Upper atmosphere Global Observation NETwork (IUGONET), was launched in 2009 by the five Japanese universities and institutes (NIPR, Tohoku Univ., Nagoya Univ., Kyoto Univ., and Kyushu Univ.) that have been leading ground-based observations of the upper atmosphere for decades.

- The MDB will be of great help to researchers in efficiently finding and obtaining various kinds of observational data we have obtained for many years by the global network of radars, magnetometers, optical sensors, helioscopes, and so on.

IUGONET metadata archiving

- We investigated widely-used metadata formats in various scientific fields in the course of the development of the IUGONET common metadata format [1]. Among them we selected the SPASE data model/metadata format [2] as the base of our metadata format since it matches best the upper atmospheric data and holds expandability to fit any kinds of observational data.

- A few modifications according to characteristics of our observational data have been added.
  - Additional words to represent non-digital archives
  - Additional words to represent heliospheric coordinates
  - New metadata elements to describe observation location and range
Interface for cross-searching MDB

Case example 1

Case example 2

The IUGONET project will prepare an interface for arbitrary software to cross-search our MDB.

- case example 1: cross-searching from external DBs
- case example 2: cross-searching from external data analysis software

The API is soon to be determined.

Summary

The IUGONET project builds e-infrastructure (metadata database and analysis software) to promote effective use of upper atmospheric data by ground-based observations.

Current development status:

- The initial version of IUGONET common metadata format was designed based on SPASE.
- The IUGONET MDB system is being built on the basis of DSpace.
- The development of IUGONET analysis software (UDAS) is in progress by using TDAS.
- The IUGONET products will be beta-released in April or May in 2011.

* For further information on IUGONET, please visit our web site at http://www.iugonet.org/en

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References
