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Inter-university Upper atmosphere Global Observation NETWORK (IUGONET)

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To investigate the mechanism of long-term variations in the upper atmosphere, we need to create integrated and organic links between various types of ground-based observation made at different locations and altitudes. The databases of such observations, however, have been maintained and made available to the community by each institution that conducted the observations. That is one reason that those data have been used only for studies of specific phenomena. For the same reason some of the observational data have been used by only a very few researchers who were involved in the observation campaign and have never been made available to other researchers.

A six-year research project, Inter-university Upper atmosphere Global Observation NETWORK (IUGONET; <http://www.iugonet.org/en/>), was just initiated in 2009 to overcome such problems of data use by the five Japanese universities and institutes (Kyoto University, National Institute of Polar Research, Tohoku University, Nagoya University, and Kyushu University) that have been leading ground-based observations of the upper atmosphere for decades. We are collaborating to build a database system for the metadata of our observational data (Figure 1). Metadata, also known as meta-information, is "data about data"; that is, it describes the properties of data, such as the observation location and period, type of instrument, and data format. The metadata database (MDB) archiving this information will be of great help to researchers in efficiently finding and obtaining various observational data we have accumulated over many years. The MDB system will significantly facilitate the analyses of a variety of observational data, which we believe will lead to more comprehensive studies of the mechanisms of long-term variations in the upper atmosphere. Moreover, we expect that researchers will become familiar with not only data in their area of expertise but also data from different atmospheric regions by using the MDB. This will contribute to the promotion of new interdisciplinary studies regarding the upper atmosphere.

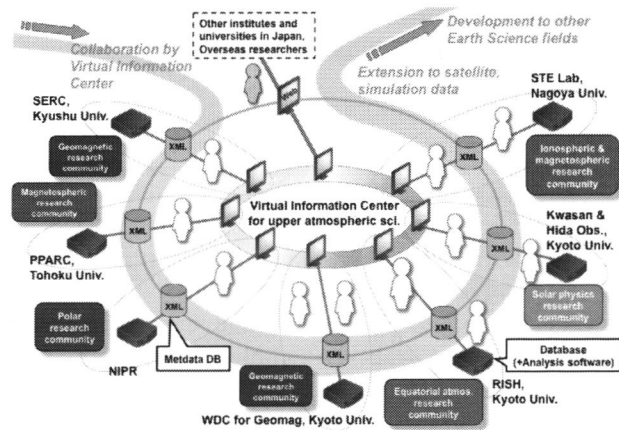


Figure 1. Schematic of the IUGONET project

The IUGONET development team, currently composed of 11 researchers representing each participating institution, have been frequently discussing at web and video conferences (about once per week) so far and has designed the initial version of our metadata format based on the Space Physics Archive Search and Extract (SPASE) data model, which is a metadata format developed by international consortium to comprehensively describe research resources regarding heliospheric and magnetospheric satellite observations. We have added some modifications depending on characteristics of our ground-based observations of the upper atmosphere. Creating metadata of our archived observational data according the metadata format is now underway. We have been working to build the MDB system on a free software named DSpace, which is widely used in many university digital repository. The development of integrated data analysis and plotting tool for our observational data (named UDAS – iUgonet Data Analysis Software) also just started, and it will be produced with the THEMIS Data Analysis Software (TDAS) Interactive Data Language (IDL) libraries and be functioned on the free, IDL Virtual Machine.

The IUGONET MDB and data analysis software (UDAS) are scheduled to be released to public in the fiscal year of 2011. Our project will be continued in order to further expand the system to other Earth science fields.