The IUGONET and its contributions for space weather study from the past to the future

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Space weather is an exciting research field on the complex system between Sun and Earth region. In order to investigate the mechanism of long-term variations on space weather, it is crucially important to make cross-cutting studies with various kinds of data observed at various regions and methods. Thus, it is needed to combine databases which maintained by each institute and to accelerate to make data-sharing network in our community. One of our approaches to solve the above problem is "The IUGONET" (Inter-university Upper atmosphere Global Observation NETwork) project. It was established in 2009 as a research project supported from the Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan, and will be closed at the end of this fiscal year. It was launched by only five Japanese universities and institutes (NIPR, Tohoku University, Nagoya University, Kyoto University, and Kyushu University), that have been leading ground-based observations of the upper atmosphere for decades. And now, the IUGONET built much collaboration with both domestic and international institutes/projects.

The IUGONET project has two main products. One of our data management frameworks is the IUGONET metadata database (MDB). As previously explained, researchers for space weather need various kinds of archived data observed by many instruments, for example radars, magnetometers, photometers, radio telescopes, helioscopes, and so on. The IUGONET MDB can help them because it treats all kind of data belonging to IUGONET institutes, and have flexibility to other type of data including the satellites and the numerical simulation which are used in our community.

Other product of the IUGONET is analysis software which can use for scientific research and publication. The iUgonet Data Analysis Software (UDAS) is a plug-in software of Themis Data Analysis Software (TDAS), which is upgraded to Space Physics Environment Data Analysis System (SPEDAS). The UDAS provides many routines for loading the ground-based observational data from various types of instruments, and performing scientific data analysis. This platform made it easier for space weather researchers to analyze a various kind of data in a unified way.

We held 7 workshops for our products approximately every six months to spread the use of them across many researchers to make contribution to space weather study. 25 reviewed journals related to the IUGONET products and their scientific applications are published. On the other hands, some problems are exposed throughout our six years activities. We plan to deal with them on our follow-up project in near future. In this presentation, we will summarize the achievements, problems, and suggestions of the IUGONET project related to space weather research.