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Inter-university Upper atmosphere Global Observation NETwork (IUGONET)

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The upper atmosphere is considered as 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. To examine the mechanism of long-term variations in the upper atmosphere, we need to combine various types of ground-based observations made at different locations and altitudes. Each database of such observations, however, has been maintained and made available to the community by each institution that conducted the observations. That is one of the reasons why 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 researcher groups who were involved in the observation campaign and are not easily accessible from the other researchers.

A six-year research project, Inter-university Upper atmosphere Global Observation NETwork (IUGONET), started in 2009 to overcome such problems of data use by the five Japanese research institutes (NIPR, Tohoku Univ., Nagoya Univ., Kyoto Univ., and Kyushu Univ.) 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 various kinds of observational data acquired by the global network of radars, magnetometers, optical sensors, helioscopes, etc. The metadata database (MDB) 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 disciplines by using the MDB. This could promote new interdisciplinary studies of earth and planetary sciences.

The outline of the IUGONET project, along with the current development status and future plan, will be presented.

Keywords: metadata, database, analysis software, upper atmosphere, ground-based observation, interdisciplinary study