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Recent activity of the IUGONET project: Update of metadata, data analysis tools and systems

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We present recent activities in the Inter-university Upper-atmosphere Global Observation NETWORK (IUGONET) project: (1) update of metadata, (2) development of a Python-based analysis tool, (3) development of a DOI registration system, and (4) application for WDS network membership. Regarding (1), the IUGONET metadata is based on Space Physics Archive Search and Extract (SPASE) data model, and the metadata for more than 1,200 datasets have been registered in the metadata database "IUGONET Type-A". The metadata schema currently used for IUGONET Type-A is SPASE 2.4.0 and is being updated to the latest version (SPASE 2.6.1). Since SPASE 2.6.1 can describe simulation data, we tried and succeeded in creating a metadata for the Ground-to-topside model of Atmosphere and Ionosphere for Aeronomy (GAIA) simulation data, which are archived and published by the National Institute of Information and Communications Technology (NICT). As for (2), we have developed a plug-in for Space Physics Environment Data Analysis Software (SPEDAS), which is written in Interactive Data Language (IDL), and a MATLAB-based analysis software (M-UDAS) to analyze various upper atmosphere data. Recently, we developed a plug-in package for Python-based SPEDAS (PySPEDAS) that includes routines for loading over 20 types of data and it is available from GitHub. PySPEDAS with the IUGONET plugin were used for analyzing EISCAT radar data at the EISCAT radar school held in Finland this August. It is expected that this plug-in will be incorporated into PySPEDAS in the near future. For (3), it is becoming common in recent years to register DOIs to data. Thus, we developed a prototype of a new system that can register data DOIs using SPASE 2.6 metadata in collaboration with NICT. This system allows us to register DOIs for many datasets registered in IUGONET Type-A. Regarding (4), we applied for network membership to WDS and it is under review as of August 2024. In the presentation, we will report on these topics in detail.