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APPLICATION OF SPEDAS TO VARSITI PROGRAM -- INTRODUCTION OF IUGONET AND ERG PLUG-INS --

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Variability of the Sun and Its Terrestrial Impact (VarSITI) program aims at understanding the current extremely low solar activity and its influence on the Earth. The VarSITI is organized by four projects as follows: SEE (Solar evolution and Extrema), MiniMax24/ISEST (International Study of Earth-affecting Solar Transients), SPeCIMEN (Specification and Prediction of the Coupled Inner-Magnetospheric Environment), and ROSMIC (Role Of the Sun and the Middle atmosphere/thermosphere/ionosphere In Climate). In particular, SPeCIMEN and ROSMIC require a comprehensive analysis of various data obtained by satellite and/or ground-based observations from multiple regions, such as solar surface, heliosphere, magnetosphere, ionosphere, and atmosphere. Thus, it is important to develop data analysis tools that enable researchers to analyze various types of data in an integrated fashion. We introduce SPEDAS (Space Physics Environment Data Analysis Software) for such an integrated analysis tool.

SPEDAS is an open-source data analysis software developed by the THEMIS Science Support Team and other contributors using IDL (Interactive Data Language). SPEDAS evolved from analysis software developed for the THEMIS mission (Angelopoulos, 2008), which was formerly called TDAS (THEMIS Data Analysis Software). SPEDAS has some useful features:

- It can download data files from remote web servers via the internet, regardless of the location and format of the files.
- Many useful routines for time series analysis are available.
- A GUI (graphical user interface) is available to those new to IDL and SPEDAS.
- It can be used with or without IDL license.
- It supports plug-in modules for multiple projects, such as THEMIS, GOES, WIND, ERG, and IUGONET.

IUGONET (Inter-university Upper atmosphere Global Observation NETwork) project is an inter-university project, which started in 2009 by five Japanese institutes and universities (Tohoku University, Nagoya University, Kyoto University, Kyushu University, and the National Institute of Polar Research) to build a research infrastructure for interdisciplinary study (Hayashi et al., 2013). IUGONET has provided a plug-in module for SPEDAS, which includes many routines to load ground-based observational data from various types of instruments, such as solar telescope, solar radio telescope, ionosphere radars (e.g., SuperDARN radars, EISCAT radar, ionosondes), atmosphere radars (e.g., MU radar, Equatorial Atmosphere Radar), imagers, magnetometers, and so on.

ERG(Exploration in energization and Radiation in Geospace) is a geospace exploration project that consists of the satellite program, ground-based observations, and modeling/simulation studies (Miyoshi et al., 2012). More than 100 researchers and 20 universities/instituted in Japan join this project. The development of the satellite is now going and the satellite will be launched in 2016. The data from the ground-based observation teams (SuperDARN, Magnetometer, VLF data, Imager, Riometer, Standard Radio Waves) is now going their activities. These data are opened to the public via the ERG Science Center. The science center develops SPEDAS plug-in

for ERG in cooperation with IUGONET.

We will present our activities how IUGONET and ERG-SC develops their mission-oriented plug-ins and how SPEDAS is useful for scientific research and capacity building in the VarSITI program.

REFERENCE

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