

Solar-Terrestrial data Analysis and Reference System: STARS

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In 1992, under the collaborations between the NASA, the ESA and the ISAS, an international project started, which is called the ISTP (International Solar-Terrestrial Physics) project. In the project, many satellites are launched and observe the wide area in the geo-space and interplanetary regions. The more scientific satellites are launched, with higher quality and quantity the data are provided by the satellites. The software programs to analyze and plot the data become complex as more data are included into the programs. A new software system was required that refers to and analyzes such a variety type of data.

The authors have been developing a data analysis system for satellite and ground-based observation data for solar-terrestrial physics: Solar-Terrestrial data Analysis and Reference System (STARS) (Murata, 2003). The STARS application works with a variety types of spacecraft data and ground-based observation data. The construction of the STARS is fully based on an object-oriented software methodology that is called Object Modeling Technique (OMT) (Rumbaugh, 1991). It is usually said that the addition of new program, class and function is rather easy if a system is designed with the OMT. The STARS meta-database provides meta-information of observation data files managed at the observation data sites (Murata et al., 2002; Murata, 2003). Users download data files through the STARS application. The downloads are done backend of the STARS application, thus users don't know where the data files are managed over the Internet. In December 2004, the numbers of mission record, data record and data file record are 25, 140 and 1,219,056, respectively. These numbers sill continue to increase.

The STARS users make a choice of data and download data files from the observation data sites, which are distributed over the Internet. The directory information for the data files are supplied by the STARS meta-database. Using the downloaded data files, the STARS makes plots. The STARS 2-D data plot gives us easy understandings of relationship between observation data. For example, on the STARS, any observation data is able to be mapped on the orbits. This function may help user's statistical studies: the user can easily recognize global structures of observation data over the Earth's magnetosphere. It should be noted that the STARS provides data plots in GSM, GSE, GEI, GEO and SM coordinate systems. Users can select any coordinate system for their research purposes on the STARS.