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Tools for Global Understanding of the Sun-Earth System

We will develop and provide the LWS community with a suite of related tools that will greatly aid the understanding of large quantities of data from disparate sources, which will be essential for attaining a global understanding of the Sun-Earth system. SPDataShop will allow a scientist to read data in many formats (e.g., HDF, CDF, NetCDF, FITS, ASCII) and produce a panel plot or image as well as file output in the desired format. SPGifWalk will unite a large number of browse-level sites offering everything from SOHO movies of the solar corona to gif images of overview time series plots from the Polar spacecraft. SPBrowse will use uniformly formatted survey data from many missions (including various indices) to allow a user to examine long and short data intervals, comparing the results from many spacecraft with ease. The survey data will also allow simple but effective types of data mining. Finally, additions to the existing ViSBARD 3-D visualization software will allow a scientist to see multispacecraft data in a variety of input formats in the context of Tsyganenko field lines and other models. All the above tools, along with software and documentation libraries, will be integrated with the Virtual Space Physics Observatory that is being designed under separate funding; this will combine easy data access with many analysis tools, making, for example, the basic analysis of a "Coordinated Data Analysis Workshop" a matter of a day's work by a single researcher using numerical data rather than a multi-day meeting of many people who share gif plots.