

Development of space virtual laboratory and simulation system

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Space scientists use vast quantities of data for their research. The data is obtained from many different kinds of instruments situated on the ground and on satellites in space. Because of the rapid advance in instruments and detector technology there has been a phenomenal increase in the quantity of data, both from observation of specific objects as well as from surveys which cover entire areas of the study. Because of the large volume of data, and the many different forms in which it is available, the storage and retrieval of data have become difficult tasks. It has also become very challenging for Space scientists to use the vast storehouse of data to produce exciting new scientific discoveries. On the other hands, Numerical simulation has become a powerful tool to analyze various plasma phenomena occurring in the solar-terrestrial environment as well as spacecraft observations and theoretical analysis. The ultimate aim of the project is for users to be able to extract data from observation and simulation archives, develop strategies for distribution of data in the most efficient possible manner and to provide for high speed data transfer between the different data centers, develop technique for bringing together the different structures to efficiently utilize the data through the establishment of a Virtual laboratory, and run different analysis tools. It will also provide on-line space simulation support system, which enables us to perform simulation runs by providing or selecting plasma parameters through Web-based interface on the internet, compare observations directly to different simulations and models. Such kind of space virtual laboratory and simulation system is very important to understand multi-scale interactions of complex and coupling Sun-Earth systems.