

Variation of Global Solar Wind Structure Observed with STELab-IPS

Interplanetary scintillation (IPS) is a phenomenon that is unique and allows one to measure solar wind velocities over a wide spatial range of interplanetary space where in-situ measurements are impossible or difficult. We have been observing the solar wind velocity structure using a multi-station IPS facility (327 MHz) at Solar-Terrestrial Environment Laboratory in Japan (STELab-IPS) since early 1980's. The IPS pattern contains the information of solar wind velocities and density fluctuations passing across a line-of-sight from an observer to a radio source. We determine solar wind velocity structures by employing computer assisted tomography (CAT) to reduce the line-of-sight integration effect which degrades the determination accuracy of the solar wind structure.

In this presentation we focus on the variation of global solar wind structure from 1985 to 2009. The STELab-IPS clearly detects variations of bimodal structure, N-S asymmetry, and differences between solar cycles. We compare the solar wind structure and in situ measurements (WIND, ACE and Ulysses) to check the reliability of our observations. Furthermore solar wind velocity maps are converted to density, massloss and dynamic pressure maps by using relationship between solar wind velocity and density obtained by fitting solar wind data of NSSDC OMNI web database. We also discuss long-term trend of heliosphere expected from our IPS observations.

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