Verification of solar wind forecast using interplanetary scintillation observation

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Radio wave from compact radio sources are scattered by irregularities of electron density. The scattered waves interfere with each other as they propagate to the Earth producing diffraction patterns on the ground. This phenomenon is called interplanetary scintillation (IPS). 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 and density structures by employing computer-assisted tomography to reduce the line-of-sight integration effect which degrades the determination accuracy of these structures. This technique can be applied to forecast the solar wind approaching to the Earth before a few days because IPS observation at STEL covers a region 0.2-1AU distant from the Sun. Two different algorithms, time-sequential tomography and IPS-MHD tomography, are forecasting solar wind velocity and density at 1 AU. In this study, we evaluate the accuracy of the solar wind forecast by simulating real-time analysis of these forecast procedures using IPS data obtained from early 1990's. The results of the forecast are evaluated by in situ data measured by ACE and WIND spacecraft.