

Flux Tube Expansion Factor and Solar Wind Speed

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The solar wind speed (SWS) near the Earth has been predicted based on the inverse correlation between the flux tube expansion (FTE) factor obtained using Potential Field Source Surface (PFSS) model and the solar wind speed near the Earth. However, there exists significant discrepancies. We have carried out an investigation of the possible causes of these discrepancies by analysed the correlation between FTE and solar wind speed using the near-Earth satellite data as well as near--Sun Helios data. The FTE at the source surface were obtained using two different coronal models: PFSS model and the Current--Sheet Source Surface (CSSS) model. In general, the correlation was found to be less than 0.5 and is substantially different for the two models. The analysis further revealed a number of sources of errors owing to the limitations of PFSS model and the method adopted for tracing the coronal sources of the solar wind observed near the Earth. This presentation will discusses these limitations and ways to improve them.