Project Details

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Project Title:
Solar Wind Structure from Measured Boundary Conditions

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Summary:
We propose a focused investigation of existing spectral and magnetic observations from SOHO to quantitatively deduce the physical properties of observed outflows (velocity, mass flux, surface area) in both polar and equatorial coronal holes. These quantitative observations of velocity, mass flux and field geometry will be used as boundary conditions for a solar wind model which will be compared with direct heliospheric observations, and which could potentially be used to predict strength and location of solar wind velocity structure such as co-rotating interacting regions. Comparison of our solar wind model to heliospheric observations will help empirically determine the relationship and coupling between heliospheric boundaries (between fast and slow solar wind), surface velocity structures and magnetic field geometry. This will enable us to develop and put constraints on potential predictive capability, assessing the potential of this technique as an improved tool to predict solar wind and heliospheric conditions from future Dopplergrams, spectral images and magnetograms. This work builds upon previous work (NASA SEC GI Grant NAG511594 "Structure and Dynamics of the TR and Corona") by quantitatively applying the observed coronal hole outflow velocity structure to a solar wind model, and comparing it with direct heliospheric in-situ observations to understand and potentially predict heliospheric conditions and related non-CME geomagnetic events.

Publication References:

Summary: "

Reference: Hassler, Donald SwRI - Solar Wind Structure from Measured Boundary Conditions

Summary: no summary

Reference: Davey, Alisdair R.; McIntosh, Scott W.; Hassler, Donald M.; (2006), Investigating SUMER Coronal Hole Observations: A Robust Method of Raster Reduction, The Astrophysical Journal Supplement Series, Volume 165, Issue 1, pp. 386-399, doi: 10.1086/504376