



Properties of interplanetary magnetic clouds observed by STEREO (2007-2014)

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Interplanetary Coronal Mass Ejections (ICMEs) are the interplanetary counterpart of Coronal Mass Ejections (CMEs) erupting from the solar corona. ICMEs can be identified by distinctive observational in-situ signatures, such as low proton temperature, low magnetic field variance, enhanced magnetic field, smooth magnetic field vector rotation, low proton temperature, low plasma beta, decreasing solar wind speed, bi-directional supra-thermal electron fluxes and depleted cosmic ray fluxes (Forbush decreases). The fastest ICMEs are usually preceded by an interplanetary shock wave. A subset of ICMEs include flux rope magnetic topology, particularly well-suited for modeling studies, so-called magnetic clouds (MCs). This work presents a survey of MC events observed by the Solar Terrestrial Relations Observatory (STEREO) from May 2007 to May 2014. The analytic model by Hidalgo (2016) is used to infer the main physical parameters of each event and the results are discussed from a statistical point of view.

Reference:

Hidalgo 2016 – M. A. Hidalgo. A global magnetic topology model for magnetic clouds. iv. The Astrophysical Journal, 823(1):3, 2016.