Geophysical Research Abstracts
Vol. 18, EGU2016-17672, 2016
EGU General Assembly 2016

Simplified solutions to predicting the magnetic vectors within CMEs

Neel Savani (1), Angelos Vourlidas (2), and Antti Pulkinnen (3)

(1) Nasa GSFC / UMBC, United States (neel.savani@umbc.edu), (2) Johns Hopkins University Applied Physics Laboratory, United States, (Angelos.Vourlidas@jhuapl.edu), (3) Nasa GSFC / UMBC, United States (antti.a.pulkkinen@nasa.gov)

The direction of magnetic vectors within coronal mass ejections, CMEs, has significant importance for forecasting terrestrial behavior. We have developed a technique to estimate the time-varying magnetic field at the Earth for periods within CMEs. This technique uses solar observational data and empirical relationships along with a constant alpha flux rope model to make the predictions. The technique can be more simply treated as the aggregate from two significant contributions: 1) Estimating the initial topological structure of the CME and 2) Estimating the hypothetical Earth-trajectory after CME evolutionary effects have been considered. In this presentation, we focus on how the evolutionary effects during interplanetary propagation affect the prediction made. We focus on how reliable the predictions are for CME events when the structural shape of the CME is well defined through triangulation of multi-point observations. We show that in such cases of reliable triangulation, the predictions are relatively well constrained to perturbations in the hypothetical Earth trajectory. However, we show how the predictions can be drastically different for cases where the CME direction and orientation remain ambiguous by removing the off Sun-Earth line observations.