Geophysical Research Abstracts
Vol. 12, EGU2010-7379, 2010
EGU General Assembly 2010

The Magnetic Field Configuration of Magnetic Clouds and iCMEs: Writhe Vs. Twist

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Magnetic clouds are the most regular type of interplanetary coronal mass ejections (iCMEs), the counterparts in the interplanetary space of solar eruptions. Among other features, magnetic clouds are characterized by the smooth rotation of the magnetic field inside them. This has resulted in the current paradigm of associating magnetic clouds with twisted flux ropes. In this poster, we test this assumption by using a new model of solar eruption. Using results from a MHD simulation, we perform a "blind" reconstruction of the magnetic structure of the iCME using simulated satellite data and codes used for real observations of iCMEs. The 3-D structure of the iCME, in the simulation, does not exhibit much magnetic twist but when reconstructed from synthetic satellite data, it appears to have some characteristics of a magnetic cloud, due in particular to a writhe in the magnetic field lines. We eventually show that magnetic clouds do not necessarily have twisted magnetic field configuration.