Geophysical Research Abstracts
Vol. 12, EGU2010-14462-1, 2010
EGU General Assembly 2010

Reconnection in the initiation phase of Coronal Mass Ejections

Alexander Soenen (1), Carla Jacobs (1), Stefaan Poedts (1), Alessandro Bemporad (2), Malgorzata Selwa (3), and Clare Parnell (3)

(1) KU Leuven, Centre for Plasma Astrophysics, Heverlee, Belgium (Alexander.Soenen@wis.kuleuven.be), (2) INAF–Osservatorio Astronomico di Torino, Pino Torinese (TO), Italy, (3) School of Mathematics and Statistics, University of St. Andrews, St. Andrews, UK

We present the first results of a comparison between ideal and resistive magnetohydrodynamic (MHD) simulations of coronal mass ejection (CME) onset and early evolution performed using the Versatile Advection Code (VAC). We consider a 2.5D (axi-symmetric) setup with a quadrupolar magnetic field (triple arcade structure) superposed on a solar wind model and focus on the different magnetic reconnection events that occur when this configuration is triggered to yield a breakout CME. Clearly, in the ideal MHD, the magnetic reconnection is only due to numerical dissipation and thus only mimicking this fundamental physical process. In the resistive MHD simulations, however, the magnetic resistivity is taken to be larger than the numerical dissipation so that 'physical' reconnection occurs, although the electrical conductivity in the model is much lower than in the solar corona. We perform a parameter study with different constant resistivity values to examine how this affects the CME initiation phase and in particular the different magnetic reconnection events associated with CME initiation. We also consider an anomalous resistivity model to introduce a more realistic model for locally enhanced current-driven anomalous resistivity. We try to determine the magnetic reconnection rates in the simulated events and compare these with the values computed from detailed observations.