Project Details

ROSES ID: NRA-01-OSS-01
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Project Title:
Case Studies of CME Events: A New Application of MHD Modeling

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Summary:
A key goal of the Living With A Star program is to understand how solar activity influences the Earth and its space environment. Coronal mass ejections are the primary cause of large, nonrecurrent geomagnetic storms at Earth and are a critical link between solar and geomagnetic activity. Models that can predict the initiation and evolution of CMEs are essential to the success of Living With A Star. At a minimum, such a model must be self-consistent, fully three-dimensional, use available data such as magnetograms as input, and predict the observable effects of CMEs (as seen in emission and white-light images, for example). The ingredients for such a model exist, but the capability to model actual CME events has not yet been demonstrated. We propose to develop such a model and test its fidelity by simulating two CME events (May 12, 1997 and September 12, 2000) in great detail. While our focus will be on comparing with available data from these events, our model will be applicable to future missions such as STEREO, Solar-B, and SDO. We will perform a series of magnetohydrodynamic (MHD) computations for each event to investigate the underlying cause of the CME and its subsequent manifestations in the solar corona. A primary aspect of our project will be to directly test our model predictions against available data from SOHO and Yohkoh; we will use our improved thermodynamic MHD model so that simulated emission in EUV and soft X-rays can be computed and compared with observations. The results from these studies will be made available on the Web so that other researchers can access and further analyze the simulation results.

Publication References:

Summary: ''

Reference: Case Studies of CME Events: A New Application of MHD Modeling - Linker, Jon A. SAIC