

Project Details

ROSES ID: NRA-03-OSS-01

Selection Year: 2004

Program Element: Independent Investigation: LWS

Project Title:

A Systematic Study on Solar Sources of Major Geomagnetic Storms from 1996 to 2006

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Summary:

We propose to systematically investigate solar sources of major geomagnetic storms for an entire solar cycle from 1996 to 2006. This is based on our previous limited study for a period from 1996 to 2000. There are three major tasks: (1) unambiguously identify solar CMEs that are responsible for major geomagnetic storms and their surface source regions, (2) study the properties of geo-effective solar CMEs and their interplanetary counterparts (Interplanetary CMEs), and structural and magnetic linkage between solar CMEs and ICMEs (3) build an empirical model to predict onset time and intensity of major geomagnetic storms using solar inputs. The observational data used in this project include (1) ground-based observations of geomagnetic activity index Dst (2) in-situ solar wind plasma and magnetic observations in near-Earth space from ACE and WIND experiments, (3) solar CME observations from the LASCO instrument on SOHO, (4) coronal observations from the EIT instrument on SOHO, (5) solar magnetic observations from the MDI on SOHO, (6) other routine solar observations, e.g., flares and filaments. The data product of this project is a comprehensive set of geo-effective Sun-Earth connection events containing information on their source regions, and properties of the corresponding solar CMEs and ICMEs. The scientific goals are to answer what and why certain CMEs are particularly geo-effective, and what are the physical (structural and magnetic) connection between solar CMEs and ICMEs. The potential application of this project is to build an empirical-based model to predict major geomagnetic storms 30-100 hr in advance.

Publication References:

Summary: "

Reference: Jie Zhang / Center for Earth Observing and Space Research/George Mason U-A Systematic Study on Solar Sources of Major Geomagnetic Storms from 1996 to 2006