Project Details

ROSES ID: NNH07ZDA001N
Selection Year: 2008
Program Element: Focused Science Topic

Topic: Joint Focus Topics with Planetary Science: Extreme Space Weather Events in the Solar System

Project Title:
A Study of Space Environment and CMEs Using Radio Burst Imaging and IPS Measurements

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Summary:
The main objective of our `solar-interplanetary' studies is to make a detailed study of solar events on the surface of the Sun, to understand their evolution in the inner heliosphere, and, to investigate their effects at the near-Earth environment. The most dramatic events on the Sun, in so far as intense magnetic storms at the Earth are concerned, are solar flares and coronal mass ejections (CMEs). A flare-CME event may cause a variety of radio burst activities and radio measurements of a CME in the near-Sun region can provide a valuable probe to infer the magnetic field configuration of the CME-generating solar region. In the space between the solar surface and the Earth, the interplanetary scintillation (IPS)technique can provide important information on the size, speed, and density turbulence associated with propagating disturbances caused by CMEs. In this proposal, we plan to study specific cases of CME formation and initiation and their propagation in the interplanetary space. We shall address the following issues:

1)The magnetic configuration of the source region of CMEs;

2)The characteristic properties,if any,of these regions to

forecast the occurrence of CMEs or release of energy;

3)The finger print of the CME origin carried to the Earth,

including its effect at the Earth; and

4) The relation between the initial energy of a CME and its

propagation toward the Earth or elsewhere through the ambient

solar wind.

We address these questions with event studies that use radio,EUV,X-ray imaging,LASCO and IPS data,WIND/WAVES spectra.

The intellectual merit of this study is in understanding the initiation of CMEs. The broader impact of this study is that the information on the evolution of size and speed of CME generated disturbances will also be useful in understanding

the prediction of CMEs' arrival at the near-Earth space.

Publication References:

no references