

Global Energetics of Large Solar Eruptive Events

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Abstract

We have evaluated the energetics of the larger solar eruptive events recorded with a variety of spacecraft instruments between February 2002 and December 2006. All of the energetically important components of the flares and of the accompanying coronal mass ejections and solar energetic particles have been evaluated as accurately as the observations allow. These components include the following: (1) the total energy in the high temperature plasma determined from the RHESSI thermal X-ray observations; (2) the total energies in accelerated electrons above 20 keV and ions above 1 MeV from RHESSI hard X-ray and gamma-ray observations, respectively; (3) the potential and kinetic energies of the CME from SOHO/LASCO observations; (4) the solar energetic particle (SEP) energy estimates from in situ measurements on ACE, GOES, and SOHO; (5) the total radiated energy from the SORCE/TSI measurements where available, and otherwise from the Flare Irradiance Spectral Model (FISM). The results are assimilated and discussed relative to the probable amount of nonpotential magnetic energy estimated to be available in the flaring active regions from MDI line-of-sight magnetograms.