Coronal mass ejections and their heliospheric consequences

Nat Gopalswamy

Solar Physics Laboratory, NASA Goddard Space flight Center, Greenbelt, MD 20771, USA

Coronal mass ejections (CMEs) have been recognized as the most energetic phenomenon in the heliosphere, deriving their energy from the stressed magnetic fields on the Sun. The Solar and Heliospheric Observatory (SOHO) mission has accumulated a wealth of information on CMEs with unprecedented extent, clarity, and uniformity. The CME data base has been useful in confirming results from past missions and obtaining a number of new results on the initiation, propagation, and heliospheric consequences of CMEs. This paper highlights some of the recent results on the morphological, physical, and kinematic properties of CMEs observed during solar cycle 23. White-light signatures of CMEs and their utility in inferring coronal magnetic fields near the Sun will be discussed. Presence of coronal holes near eruption regions have been shown to significantly modify the trajectories of CMEs. New results on the interaction of CMEs with large-scale structures such as coronal holes and other CMEs will be presented. Finally, the CME consequences in the heliosphere such as interplanetary shocks, type II radio bursts, energetic particles, geomagnetic storms, and cosmic ray modulation will be discussed.