

Coronal Mass Ejections in the Heliosphere

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Coronal mass ejections (CMEs) are the most energetic events in the heliosphere, with kinetic energies exceeding 10e+32 erg. They carry large amounts of coronal magnetic fields and plasma with them and drive large-scale interplanetary shocks. The plasma impact leads to magnetic storms on planets with magnetospheres. Geomagnetic storms are well known and the severest of them are caused by CMEs. The shocks accelerate solar energetic particles up to GeV energies, which have important implications for space weather and human space flight. CMEs form merged interaction regions in the heliosphere, which act as magnetic barriers for the galactic cosmic rays entering the heliosphere. After a brief summary of the decade-long observations of CMEs by the Solar and Heliospheric Observatory (SOHO) mission, I will discuss the consequences of CMEs in geospace and in the heliosphere. I will also discuss the consequences of cycle 23. Finally, I will briefly discuss the extreme events of cycle 23 such as the October November 2003 CMEs and their impact at various locations in the heliosphere. Work supported by NASA/LWS and SR&T programs.