INTERPLANETARY EFFECTS OF CORONAL MASS EJECTIONS AND THEIR SPACE WEATHER IMPLICATIONS

ABSTRACT

Ajaysinh K Jadeja[1] & K N Iyer[2]

[1] Christ College, Nr. Saurashtra University, Rajkot-360 005. INDIA
Email: akjadeja@indiatimes.com

[2] Department of Physics & Electronics, Saurashtra University, Rajkot-360 005. INDIA
Email: iyerkn@yahoo.com

Using IPS observations, CMEs (Coronal Mass Ejections) have been detected over the entire Sun-Earth distance (Manoharan et al. 1995). In this work the transit type Radio Telescope at Rajkot (22^0 18' 28.82" N, 70^0 44' 26.58" E) is used for IPS observations. The Radio telescope detects the signatures of Interplanetary Disturbances either resulting from CME or CIR (Co-rotating Interaction Region). The IPS array at Rajkot is operating at 103 MHz and monitors the different radio stars like 3C2, 3C119, 3C123, 3C47, 3C48, 3C296 etc. The Radio stars intensity undergoes fluctuations due to the plasma irregularities in the solar wind, which crosses the line of sight. From this intensity fluctuation the Scintillation Index is computed.

CMEs are very large structures containing plasma and magnetic fields that are expelled from the sun into the heliosphere at speeds of several hundreds to over 1000 km / second. CMEs are important solar phenomena, as they influence the physical condition of the interplanetary medium. They are mainly responsible for producing interplanetary shocks and disturbances. In this work we have studied a sequence of CME events (mainly halo CME), which occurred in the years 1998 to 2001. Enhancements in Scintillation Index associated with CMEs are identified. Their dependence on CME location on the solar disc, and on CMEs magnetic structure are investigated. Associated space weather effects are discussed. It is shown that IPS signature of CMEs can be used as a precursor of approaching space weather disturbances.