



## **Response of magnetosphere to the impact of CME clouds**

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The multi-point Cluster observations provide the opportunity to study the response of the magnetosphere to the impact of extreme solar events such as CMEs. The four-point Cluster FGM (high resolution), CIS and PEACE data together with the models of magnetosphere and magnetopause are used to study the speed of compression of the dayside magnetosphere at the impact of 17 CMEs during 2001-2005. The study of the high resolution (45 ms) FGM data shows that the speed of compression (within three seconds of impact) increases with the dynamic pressure of the CMEs, and that this speed exceeds the speed of the CMEs in some (five) cases (suggesting impulsive response) when the dynamic pressure of the CMEs exceed about 20 nPa. The magnetosphere is also found to undergo damping oscillations for about two minutes after the impact of some extreme CMEs (24 October 2003 and 29 October 2003) until the magnetic pressure outside and inside the magnetopause balances. The speed of compression is also found to increase with the negative IMF B<sub>z</sub> of the CME suggesting that part of the compression could be apparent due to the inward movement of the magnetopause due to magnetic reconnection. The ion and electron densities and velocities (CIS and PEACE data), though of low resolution (4 seconds), also indicate fast compression of the magnetopause at the impact of the CMEs. However, the signature of oscillation of the magnetosphere at the impact of the extreme CMEs is observed only in electron velocity data. The ion and electron densities show no signature of oscillation. The study is continued to understand the magnetic field-plasma interactions

at short time scales.