

# ON THE HELIOPHYSICAL AND GEOPHYSICAL DRIVERS OF THE NOVEMBER 20-21, 2003 SUPER STORM

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A study of some heliophysical and geophysical drivers of the super storm of November 20-21, 2003 is presented using GOES 5-minute values of Solar X-rays: 1 - 8 Å, the total magnetic field  $B$ , plasma temperature  $T_p$ , plasma beta, alpha/ proton ratio, interplanetary electric field  $E_y$ , the proton number density  $N_{sw}$ , the solar wind flow speed  $V_{sw}$ , the solar wind dynamic pressure  $P_{sw}$ , the IMF  $B_z$  component in the GSM coordinate and hourly values of the low-latitude magnetic index,  $Dst$ . The results obtained in our investigation appear to suggest that very large X class flares may not always lead to very intense geomagnetic storms, and flares of M importance could be responsible for intense storms. Furthermore, the results do suggest that the solar wind structure that was responsible for the major storm of November 20-21, 2003 is of the shock-driver gas configuration in which the sheath is the most geoeffective element. The present results also show that an intense storm can be driven by two successive southward  $B_z$  structures without a resultant “double dip” at the boundary of these structures within the corresponding interval of the main phase.

Heliophysical phenomena; Interplanetary processes; Geomagnetic storm.