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Time Delay Between Dst Index and Magnetic Storm Related Structure in the Solar Wind

Abstract:
We have selected a number of large isolated magnetic storms with an associated Dst minimum value less than -100 nT. After dividing them into two groups based on the minimum values of Dst, we have performed a superposition of Dst and interplanetary parameters B, v, Np and Tp for each of the two groups. We have found that two interplanetary parameters, namely B and v, are sufficient to reproduce Dst for each of the two groups with correlation coefficient cc ~ 0.97 - 0.98 provided that the interplanetary parameter times are taken 4 - 5 hours earlier than the associated Dst times. This result is also verified for individual storms as well. As shown previously, faster solar wind structures with stronger B are responsible for very large storms. The total duration of SRS (storm related structure in the solar wind) is 4 - 5 days which is the same as the associated Dst interval of the magnetic storm.