



Interaction of strong interplanetary discontinuities with the bow shock and magnetopause

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Propagation of interplanetary discontinuities through the interplanetary space, their modification in the foreshock and interaction with the bow shock and magnetopause are key problems of the Space Weather Program because they are often connected with strong geomagnetic disturbances. The present situation with two monitors (ACE, Wind) at the L1 point and number of spacecraft (Themis, Cluster, Geotail) orbiting in the critical regions provides an excellent opportunity to investigate these interactions.

The present study is oriented (but not limited) to the fast forward shocks because these events are usually connected with major geomagnetic storms. We follow the path of different discontinuities through the solar wind and magnetosheath and compare the observations with MHD predictions. The identified discontinuities are sorted according to the Mach number, direction of their propagation and jumps of parameters across the discontinuity and their geoeffectiveness is estimated. Our study reveals that the angle between the normal to the discontinuity plane and solar wind velocity vector is one of the most important parameters that determines the reaction of the magnetosphere to the discontinuity arrival.