



Solar wind control of the magnetopause location: New insight

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The solar wind dynamic pressure is believed to be the principal factor controlling the magnetopause location. Their mutual relation is usually considered in a power-law form and suggested indices vary from $-1/4.8$ to $-1/6.6$ in present magnetopause models. In the paper, we analyze THEMIS dayside magnetopause crossings observed in a broad range of upstream pressures (0.2–20 nPa) and discuss the relationship between the dynamic pressure and the magnetopause stand-off distance and flaring angle. We found that although the power-law form provides the best description of variations of the stand-off distance with upstream pressures for a full set of crossings as well as for subsets constrained by a sign of the interplanetary magnetic field (IMF) vertical component, IMF cone angle, and solar wind speed, the most appropriate value of the power index resulting from the present study is $-1/3.83$ if only a dependence on the upstream solar wind pressure is considered. We discuss power index variation dependences on the IMF direction and solar wind speed and influence of the orbital-spacecraft limitations.