Subsolar magnetopause under an inverse gradient of the magnetic field: Statistical study

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The magnetopause is usually at the point where the pressure of the magnetospheric magnetic field is balanced by a sum of the thermal plasma and magnetic pressures on the magnetosheath side. However, statistics from THEMIS magnetopause crossings have showed that about 2% of them exhibit a larger magnetic field in the magnetosheath than in the magnetosphere in the subsolar region (Y_{GSM} < 5 R_E) and thus, the pressure from the magnetosheath side seems to be uncompensated. In our study, we compare parameters of those unusual crossings with the rest of our statistic in that region with motivation to highlight the possible sources and mechanisms of this apparent pressure imbalance, which can be caused either by specific upstream solar wind conditions or by the state of the magnetosphere. We also compare our THEMIS results with the sets of magnetopause crossings observed by other spacecraft (e.g., Cluster, MMS).