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Pressure balance of extreme magnetopause locations

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We have collected data set of more than 7000 crossings of the subsolar and flank low-latitude magnetopause observed by five THEMIS spacecraft in course of the 2007–2009 years and determined the differences between observed magnetopause radial distances and those predicted by an empirical magnetopause model. The data propagated from the L1 point as well as measurements of near-Earth solar wind monitors (whenever available) were used as a model input. Analyzing the results, we found many cases where the difference between observed and predicted magnetopause locations reaches 3 RE.

We have selected such observations and searched for sources of these disagreements. We found that a part of them is connected with transient events like HFAs and other discontinuities. For the rest of cases we compute all components of the total pressure at both magnetopause sides and discuss a role of the low-energy ions of plasmaspheric origin in the pressure balance.