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Interplanetary magnetic field effects on the magnetopause location

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We use a large set of nearly 15,000 subsolar magnetopause crossings identified in the THEMIS A-E, Magion 4, Geotail, and Interball-1 satellite data to analyze the effect of interplanetary magnetic field (IMF) on the location of the magnetopause. Differences between the observed and empirical model magnetopause distances are used to account for the magnetopause distance variations due to the changes in the solar wind dynamic pressure. It is shown that not only the IMF B_z component but also the IMF clock angle has a significant effect on the magnetopause location, which is not included in traditional empirical models. Additionally, IMF B_y component can cause considerable dawn-dusk asymmetry in the shape of the magnetopause at times of very low Alfvén Mach numbers ($M_A < 4$). Both the magnitude and orientation of the IMF B_y component seem to affect the magnetopause distance. The obtained results are consistent with a global MHD model run at the Community Coordinated Modeling Center (CCMC).