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Accuracy of bow shock models focused to dayside and high-latitude observations

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There are several models of the Earth's bow shock shape and location, but none of them fully agree with observations for all solar wind parameters and magnetic field range. Moreover, there has been a lack of observations from several regions such as high latitudes to enable a deeper statistical verification of validity of the bow shock models there. We collected hundreds of additional bow shock crossing observations from the Interball-1 and Cluster fleet spacecraft that have not been processed and exploited so far, mainly in high-latitude dayside parts of their orbits and also many new observations from the Themis dayside intervals. By a statistical treatment we have compared individual models with this extended data set and we have found systematic deviations from a prediction with increasing latitudes. The contribution is aimed to comparison of various factors that can affect the accuracy of the existing bow shock empirical models – namely the shape of bow shock dayside surface fits used by the models, the Earth's dipole tilt, or possible indentation of magnetopause in cusp regions.