



Study of the shape and motion of the bow shock: Themis contribution

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The bow shock decelerates and deviates the supersonic solar wind flow around an obstacle and its distance from the obstacle is a function of dimensions of the obstacle, solar wind parameters, and IMF strength. However, the shape and dimensions of the magnetopause that represents the obstacle in the case of the Earth vary with the magnetic dipole orientation and all upstream parameters. The problem is very complex because the models describing locations of both boundaries are based on a statistical processing of crossings observed by a single spacecraft. Such crossings locate the boundaries in motion, i.e., in non-equilibrium state and this can be a source of significant errors.

We use observations of the dayside low-latitude bow shock crossings and compare them with several experimental models. The fleets of THEMIS and Cluster spacecraft allow us to determine not only the actual bow shock and magnetopause locations but timing of multi-point observations provides the speed of their motion. In this case, it is important that bow shock observations are complemented with the solar wind data measured just in front of the observed crossing.