The terrestrial magnetopause is one of the most important boundaries in space physics because it separates the magnetospheric plasma from the plasma of solar origin. Its location depends on the pressure balance between the internal geomagnetic field and the solar wind. Predictions of different two- and three-dimensional magnetopause models are discussed for three events from the declining phase of the last solar cycle when intensive Coronal Mass Ejections resulted in large geomagnetic storms. Magnetopause crossings observed by the GOES and Cluster satellites at extreme locations are compared with the calculated magnetopause locations.

The location and shape of the terrestrial bow shock is determined by several interplanetary parameters and also by the location of the magnetopause. It is discussed how the influence of the three-dimensional asymmetric magnetopause (shaped by the changing dipole tilt angle) can be taken into account when predicting the location of the bow shock under extreme and average solar wind conditions. Bow shock crossings observed by the Cluster satellites are used for the investigation.

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