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Venusian bow shock: Results of previous spacecraft measurements and its reanalysis aimed for Venus Express studies preparation

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The crossings of Venusian bow shock (BS) by Venera 4,6,9,10, Mariner 5,10, Pioneer Venus, and Galileo spacecrafts revealed several peculiarities of this boundary. Its terminator/pre-terminator position turned to be weakly dependent on solar wind parameters variations within specific phase of solar cycle (Venera 9,10) while strongly variable within solar activity cycle (Pioneer Venus). Bow shock terminator position anisotropy was revealed for quasi-perpendicular upstream solar wind flows (Venera 9,10, Pioneer Venus), and theoretically expected variation of post-terminator BS position with change of the Mach cone angle was also found (Galileo).

These and others peculiarities of Venusian bow shock are reviewed and quantitatively refined with the aid of recent semi-empiric BS modeling approach, which additionally permitted to reveal the 'dawn-dusk' bow shock terminator asymmetry. Thus developed detailed semi-empiric Venusian BS model can be used for analysis of expected BS crossings by Venus Express orbiter.