AOGS 2005

The dayside magnetosphere of Mercury

MASSETTI S., ORSINI S., MURA A., MILILLO A., MANGANO V., DE ANGELIS E.
Istituto di Fisica dello Spazio Interplanetario, IFSI-INAF, Roma, Italy.

Many efforts are currently in progress to depict a realistic model of the Herman magnetosphere, also in the frame of the researches that will be performed by the next space mission Messenger and BepiColombo. Although the magnetosphere of this planet can be roughly approximated by scaling the Earth's one (about 1:6.9), several differences are expected due to both the lack of an ionosphere, which rise questions concerning the closure of the magnetospheric currents, and the likely absence of a stable ring current.
A remarkable feature, outlined by the models, is represented by the wide area accessible by the solar wind plasma on the Mercury's dayside, due to the broad footprint of the magnetospheric cusps. The absence of a dense atmosphere/ionosphere implies that a large faction of the impinging plasma can reach the planet's surface. We present the results obtained by comparing two modellization of the Mercury's magnetosphere by means of adapted Tsyganenko and Toffoletto-Hill models. The analysis is focused on the dayside magnetospheric configurations and plasma precipitation patterns, derived by taking into account the effect of the magnetic reconnection with the interplanetary magnetic field. The role played by the longitudinal IMF component (B_x) is also discussed.
On the basis of the results, we try also to outline a comparison between some Earth's magnetospheric phenomena and the expected counterparts that could be observed at Mercury.