Geophysical Research Abstracts
Vol. 12, EGU2010-15160, 2010
EGU General Assembly 2010

The Electrodynamics of the Solar Wind Interaction with Venus

C. T. Russell (1), Y. J. Ma (1), and J. G. Luhman (2)
(1) IGPP/ESS, UCLA, Los Angeles, Ca, (2) 2SSL, UCB, Berkeley, CA

Venus has a thick atmosphere whose upper reaches are ionized by solar EUV. The temperature and density of this ionosphere provide sufficient pressure that, at solar maximum for normal solar wind pressures, the solar wind is deflected at altitudes far above the region of significant ion-neutral collisions. Hence when the interplanetary field changes, a current is induced at the ionopause that excludes the magnetic field from the ionosphere. A magnetic barrier of magnetic field draped around the ionosphere builds up and forms the obstacle to the solar wind flow. Since the size of the Venus obstacle vastly exceeds that of the ion-gyro motion, a bow shock forms that slows, heats, and deflects the solar wind plasma. This interaction is the epitome of the induced magnetosphere.
At times though, the solar wind pressure is too strong to be stood off by the ionosphere, and the ionopause drops to collisional altitudes. At this point, the ionosphere becomes magnetized throughout. Venus also has an H and O exosphere that extends into the solar wind. These can lead to the occurrence of cometary processes like mass pickup and deceleration of the flow. In short, the solar wind interaction with Venus has many facets and is sufficiently complex to continue to fuel new discoveries and a little controversy.