

Ion composition of the Venusian ionospheric hole

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Ionosphere of the Venus interacts with the solar wind directly because the Venus doesn't have intrinsic magnetic field. The plasma depletion hole is also caused by these interactions. The holes were observed with a stronger and anti sunward magnetic fields which originate in the Interplanetary Magnetic Fields (IMF). The draped magnetic field configuration in the ionosphere is still unknown. Two types of electron temperature (T_e) distributions in the hole were also observed; one is lower than the surrounding ionospheric electron temperature and the other is higher than that temperature. The model which satisfied with the characteristics of these holes has not been established yet. However, the cases that H^+ was not major ion were observed to make clear that the role of H^+ in the hole. we investigated ion composition and its dynamics. From analyses of draping magnetic field and T_e in the ionosphere, we infer that there are two types of hole,

- 1) Field line is connected with IMF directly and T_e is higher than surrounding ionosphere (type 1).
- 2) Field line is horizontal and not connected with IMF and T_e is lower than surrounding ionosphere (type 2).

Type 1 was found at any altitude, but many of them were found at high altitude. Density ratio of H^+ and O^+ ($n(H^+)/n(O^+)$ ratio) is high in type 1 found at high altitudes. Characteristic diffusion time of H^+ from the bottom of the ionosphere is shorter than chemical equilibrium time at the altitude that type 1 was found. It implies that field line was connected with the bottom of ionosphere and H^+ diffused along magnetic field line for the case of type 1. Type 2 was found only at low altitudes. All ion components depleted and $n(H^+)/n(O^+)$ ratio was equal to surrounding ionosphere. Since the magnetic field line is horizontal at low altitudes, chemical reaction and advection from dayside are effective. The ion composition distribution is consistent with the result of magnetic field and electron temperature analysis.