

Simulation of water group neutral cloud distribution in Saturn's inner magnetosphere

Hiroyasu Tadokoro[1]; Hiroaki Misawa[2]; Fuminori Tsuchiya[3]; Yuto Katoh[3]; Akira Morioka[1]; Mizuki Yoneda[2]
[1] Planet. Plasma and Atmos. Res. Cent., Tohoku Univ.; [2] PPARC, Tohoku Univ.; [3] Planet. Plasma Atmos. Res. Cent.,
Tohoku Univ.

Water group neutral particles dominate the dynamics of Saturn's inner magnetosphere since neutral density in Saturn's inner magnetosphere is about ten times greater than plasma density (Richardson, 1998). Therefore, it is important to understand a neutral distribution in Saturn's inner magnetosphere. Cassini observations have revealed that icy moon Enceladus ($L \sim 3.94$) is highly active with plume of water from its south polar region (Porco et al., 2006). Shemansky (1998) estimated that the total number density of the water group neutral gas could be as much as 3000 /cc based on observations of Hubble Space Telescope. Ip (1997) showed neutral cloud distribution is generated by sputtering from icy satellites.

Solving the kinetic equations based on Ip (1997), we have derived water group neutral cloud in Saturn's inner magnetosphere. We consider sputtering from Enceladus as release process of water molecule. In this presentation, we will show the calculated results and discuss global neutral distribution.