Japan Geoscience Union Meeting 2013
(May 19-24 2013 at Makuhari, Chiba, Japan)

PPS23-20 Room:201A Time:May 23 16:30-16:45

Electrostatic Solitary Waves (ESWs) and electron beams observed by Kaguya near the Moon

Kozo Hashimoto[1*], Yoshiharu Omura[1], Yoshiya Kasahara[2], Hirotsugu Kojima[1], Yoshifumi Saito[3], Masaki N Nishino[3], Takayuki Ono[4], Hideo Tsunakawa[5]

[1]RISH, Kyoto U, [2]Information Media Center, Kanazawa U, [3]JAXA/ISAS, [4]Graduate School of Science, Tohoku U, [5]Deparment of Earth and Planetary Sciences, Tokyo Institute of Technology

In KAGUYA (SELENE) LRS[1], WFC-L[2] observes waveforms of plasma waves in 100Hz-100kHz and a lot of electrostatic solitary waves (ESWs) have been observed[3]. Although the orthogonal dipole antennas are generally used in the observations, sometimes a pair of monopole antennas were used. We analyze the magnetic field[4] and plasma environment[5] around the observed regions.

Observed waveforms are fitted to ideal ESW waveforms parallel to the magnetic field and the perpendicular component. The propagation velocities and the potential scales are also evaluated in the case of the monopole observations.

In the present report, electron distribution functions are analyzed. Electron beam components are derived by subtracting background thermal Maxwellian distribution from parallel distribution integrated over perpendicular component based on the electron beam analysis for ESW observed by Geotail[6]. Relation among ESW, electron beam, and magnetic field observed in the solar wind, above the magnetic anomalies, in the wake boundaries, and inside the wake will be discussed.

References

[1] T. Ono, et al., The Lunar Radar Sounder (LRS) Onboard the KAGUYA (SELENE) Spacecraft, Space Science Reviews, 154, Nos. 1-4, 145-192, DOI:10.1007/s11214-010-9673-8, 2010

[2] Y. Kasahara, et al., Plasma Wave Observation Using Waveform Capture in the Lunar Radar Sounder on board the SELENE Spacecraft, Earth, Planets and Space, 60, 341-351, 2008.

[3] K. Hashimoto, et al., Electrostatic solitary waves associated with magnetic anomalies and wake boundary of the Moon observed by KAGUYA, Geophys. Res. Lett., 37, L19204, doi:10.1029/2010GL044529, 2010.

[4] H. Tsunakawa, et al., Lunar Magnetic Field Observation and Initial Global
Mapping of Lunar Magnetic Anomalies by MAP-LMAG Onboard SELENE (Kaguya), Space Sci. Rev. 154, 219-251,2010, DOI 10.1007/s11214-010-9652-0

[5] Y. Saito, et al., In-flight performance and initial results of Plasma energy Angle and Composition Experiment (PACE) on SELENE (Kaguya), Space Science Reviews, Vol. 154, No. 1-4, 265-303, 2010.

[6] Y. Omura, et al., Electrostatic solitary wavescarried by diffused electron beams observed by the Geotail spacecraft, Geophys. Res., Vol. 104, No. A7, 14,627-14,637, 1999.

Keywords: Kaguya, ESW, electron beam