Plasma waves depending on magnetic and plasma environment around the moon observed by LRS/WFC onboard KAGUYA

Sunao Kitaguchi[1*], Yoshiya Kasahara[1], Yoshitaka Goto[1], Kozo Hashimoto[2], Yoshiharu Omura[2], Atsushi Kumamoto[3], Takayuki Ono[3], Hideo Tsunakawa[4], Masaki N Nishino[5], Yoshifumi Saito[5], Shoichiro Yokota[5], Hidetoshi Shibuya[6], Masaki Matsushima[4], Hisayoshi Shimizu[7], Futoshi Takahashi[4]

[1]Kanazawa Univ., [2]Kyoto Univ., [3]Tohoku Univ., [4]Tokyo Inst. Tech, [5]JAXA/ISAS, [6]Kumamoto Univ., [7]Tokyo Univ.

The WFC (waveform capture) is one of the subsystem of LRS (Lunar Radar Sounder) onboard KAGUYA. The WFC measures plasma waves and radio emissions around the moon detected by the two orthogonal 30 m tip to tip antennas. The WFC consists of a fast sweep frequency analyzer (WFC-H) covering from 1 kHz to 1MHz and a waveform receiver (WFC-L) covering from 10 Hz to 100 kHz.
Although the moon has basically a unmagnetized body, there are number of small crustal fields which have large magnetic anomalies. Caused by these magnetic anomalies, presence of mini magnetospheres is suggested over the anomalies. These regions are, therefore, very interesting from the viewpoint of plasma physics.
In the present study, we report plasma waves especially observed around lunar magnetic anomalies.
According to the observation by WFC-H, intense wave activities below several kHz were often recognized when KAGUYA passed over the magnetic anomaly. The wave activity becomes larger when the magnetic anomaly is located around the terminator of the moon, especially in the downstream of the solar wind.
In the presentation, we demonstrate the characteristics of these wave phenomena and their spatial distribution depending on the magnetic and solar wind condition as well as particle distribution.

Keywords: KAGUYA, waveform capture, magnetic Anomaly, plasma wave, moon