

## Solar wind condition of 100-second magnetic field variations observed by Kaguya/LMAG above the lunar magnetic anomaly

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Large-amplitude, low-frequency waves of magnetic field about 100-sec periods associated with the moon have been investigated by using Kaguya/LMAG magnetic field observation during the period from December 1, 2007 to November 30, 2008 on its orbit 100 km above the lunar surface when the moon was in the solar wind. They were not detected by ACE spacecraft in the upstream solar wind. They were observed mainly on the dayside of the Moon. The low-frequency waves were nearly circularly-polarized, but there were compressional components. Some of them exhibit left-hand polarization, and others did right-hand polarization in the spacecraft frame of reference according as the angle between the wave number vector and the solar wind velocity. The waves are supposed to be generated by the protons reflected by the moon through cyclotron resonance with the MHD waves in the solar wind. The occurrence of the 100-sec waves concentrated on the magnetic anomalies on the lunar surface, especially on the area of  $-10^{\circ}$ - $-50^{\circ}$  in latitude and  $150^{\circ}$ - $200^{\circ}$  in longitude. It suggests that the waves were generated by the solar wind ions reflected by the magnetic anomalies.

In order to know the solar wind condition of occurrence of the 100-second magnetic field variations observed by Kaguya/LMAG above the lunar magnetic anomaly, solar wind density and velocity were examined by using ACE observation shifted to the Kaguya position. The power of the 100-sec wave was calculated from the 1-sec averaged magnetic field data obtained by Kaguya/LMAG during the period from December 1, 2007 to November 30, 2008. The data were Fourier transformed every 300 sec.

The power of the 100-sec wave was large when the number density of the incident solar wind and/or the solar wind speed was large. As the solar wind density increased, the power enhanced. It is consistent with the idea that the waves were generated by the solar wind protons reflected by the magnetic anomalies.

Keywords: Moon, magnetic field, Kaguya, LMAG, solar wind, reflected proton