Global mapping of the lunar magnetic anomaly using Map-PACE-ESA (Electron Spectrum Analyzer) onboard Kaguya (SELENE).

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The Moon has no global magnetic field. However, measurements by magnetometers on the Apollo subsatellites and the returned samples showed the existence of extensive crustal magnetism. The largest areas of strong magnetic anomalies were located antipodal to impact basins such as Imbrium, Orientale, and Nectaris that were formed in the same period. According to Lunar Prospector data covering the whole lunar surface, strong magnetic anomalies were located radial, or antipodal to the Impact basins. These results suggest how the magnetic anomalies were made. These anomalies also correlate with albedo markings on the lunar surface. This is because structure like mini-magnetosphere around the anomalies and related shock will deflect solar wind ions. Lunar Prospector also observed electron heating near the anomalies.

We have observed the lunar magnetic anomaly by electron reflection method using the data obtained by MAP-PACE-ESA and MAP-LMAG (Lunar MAGnetometer) onboard Kaguya. Since Kaguya is a three-axis attitude controlled satellite, we need two sensors mounted on the moonward and the anti-moonward spacecraft panels in order to obtain three-dimensional electron distribution functions. The ESA sensor basically employs a method of a top-hat type electrostatic analyzer placing angular scanning deflectors at the entrance and toroidal deflectors inside. The Field Of View (FOV) is electrically scanned between +/-45 degrees inclined from the axis of symmetry. Since May 2008, ESA has been operated with high time resolution (˜2s) mode. We will present the global mapping of the lunar magnetic anomaly using the high time and spatial resolution data and discuss how the lunar magnetic anomalies correlate with the selenographical features.