Multi-cubesat mission to measure spatial structure of lunar magnetic anomalies

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Although it has been well known that the lunar crust is magnetized since the Apollo era, the origin and history of the Moon's magnetic field still remain an open problem in lunar science. Until now, it has been discussed whether the crustal magnetism is associated with a steady magnetic field generated by a core dynamo. To address this open problem, magnetometer data acquired from Lunar Prospector and Kaguya spacecraft have been used. Mapping of the Lunar Prospector and Kaguya magnetometer data shows isolated and clustered magnetic anomalies on the lunar surface. In order to examine the characteristics (i.e., direction and strength of the dipole moment, and depth of the source) of the magnetic anomalies, a dipole model has been applied for each of lunar magnetic anomalies. These model magnetic parameters play a significant role in determining the origin and history of lunar magnetic field. However, those values depend on models and spatial structure of magnetic anomalies obtained from a single spacecraft. Thus, the results may be problematic and lead to false conclusions. To overcome these problems, it will require various altitude measurements extending nearly down to the surface using multi-satellite observations such as a fleet of cubesats to reveal the full spatial structure of lunar magnetic anomalies. Such multi-cubesat missions will enable to answer major questions in lunar science.