

Global classification map of lunar absorption spectra and new impression of lunar crust formation.

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This report presents the global classification map of lunar absorption spectra by unsupervised classification methods and new impression of lunar crust formation based on the map.

Geologic map is an important tool to understand formation process of lands. Many Moon's geologic maps has been made by many researchers based on their own criteria. Therefore we are hard to compare different sites on the Moon far from each other.

In order to solve such problem, the study of making global geologic map of the Moon has been started 3 years ago, and we made the global classification map of lunar absorption spectra based on hyper spectrum data of Spectral Profiler/Kaguya. Since this map was produced by both K-means and ISODATA of unsupervised classification methods under unified criteria for whole Moon, we can easily compare a region with others far from there.

The entire Moon was divided into 66 classes of lunar absorption spectra. The entire Moon was divided into 66 classes of lunar absorption spectra by unsupervised classification methods and those were categorized as 5 regional groups based on major corresponding location, which were Mare (M) group, Highland (H) group, South Pole-Aitken (S) group, Boundary between groups of M/S and H (B) group and Ejecta from fresh highland craters (E) group.

Some local class distributions showed good agreement with past those such as Aristarchus region, Orientale region, SPA region and highland region. Also, it was found that some area of B group covered cryptomaria and some spectrum classes corresponded to craters itself in maria and highland region. Furthermore, some new impressions of the lunar crust formation related to cryptomaria and/or layer structure of subsurface were found through comparison of different sites far from each other based on the presenting global map.

Keywords: Moon, geologic map, crust formation