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Source of the lunar magnetic anomalies estimated with the prism model

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Many magnetic anomalies have been observed on the Moon since the Apollo project, although the Moon has no global intrinsic magnetic field at present. The lunar magnetic anomalies are considered to be caused by remanent magnetization of the lunar crust. Several models of the lunar magnetic anomalies have been proposed (e.g. Hood et al., 2001, 2013; Richmond et al., 2008; Purucker et al., 2012; Nicholas et al., 2007; Hemingway and Garrick-Bethell, 2012; Wieczorek et al., 2012). However, the magnetized material and its magnetizing process have been still controversial. In the present study, we have analyzed several magnetic anomalies with the prism model, in which three dimensional position, size, horizontal direction and magnetization are parameterized. The observation data by Lunar Prospector and Kaguya at the low altitude were used in the analysis. We adapt a forward modeling approach, in which the source parameters are changed iteratively till the minimum RMS (Root-Mean-Squares) misfit between the model and data is achieved. The optimal number of the prisms for modeling is objectively determined using Akaike's Information Criterion.We will discuss possible source materials on the basis of the modeling results.

Keywords: moon, magnetic anomaly, prism source model, swirl