

月の巨大衝突構造における海の火成活動 Mare basalt volcanism within the giant impact structure of the Moon

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Toward an understanding of the evolution of the Earth and other terrestrial planets, it is important to study the thermal evolution of the Moon. Estimate of volumes and eruption ages of lava ponds is essential to construct the volcanic history of the Moon. Therefore, these estimates have been performed in the lunar maria, a lowland area covered with basalt.

The South Pole-Aitken (SPA) basin, located on southern lunar farside, is one of the oldest and largest impact structures in the solar system. The basin ranges ~13 km in depth, and its rim crest diameter is about 2500 km. Previous studies of numerical simulation for SPA-forming impact indicate that the large impact generated a melting zone ranging 500 km depth and changed the thermal condition of the underlying mantle.

In order to evaluate the effect of the SPA-forming impact on volcanic activity, we estimated the thickness and the volumes of lava ponds of Apollo, Leibnitz, Ingenii, located within the SPA, using high-resolution image data obtained by Kaguya. Volumes of these maria were estimated as 4440-7330 km³, 4880-12580 km³, and 5830-53570km³, slightly smaller than estimate of previous study. In comparing the volumes of lava ponds of northern lunar farside, there is no significant difference, suggesting that SPA-forming impact did not contribute to magma production.

Keywords: SPA, mare volcanism, Apollo, Leibnitz, Ingenii