

PPS003-03

Room: 201A

Time: May 24 09:30-09:42

Anomalous Moscovience Basin: Double-Impacts or Single Inclined Impact ?

Yoshiaki Ishihara^{1*}, Tomokatsu Morota², Sho Sasaki¹

¹RISE Project, NAOJ, ²ISAS/JAXA

Recently, the Japanese lunar exploration SELENE (Kaguya) has been finished with great success. The new data set that obtained by numerous instruments on board Kaguya enables us to investigate lunar origin and evolutions in depth from new aspect than previous studies. Especially, the Kaguya gravity model drastically improved our knowlege of lunar farside gravity figures. The lunar topography model was also improved by new topography model derived by laser altimeter mission of Kaguya. These new selenodetic data enable us to investigate basin structures not only on the lunar nearside, but also on the lunar farside.

Moscoviense basin, which is the most prominent mare basalt filled multi-ring impact basin on the lunar farside, is located (26oN, 148oE) and has 445 km or 420 km in diameter main ring (= rim). Some co-centric circular structures (except for rim) of the Moscovience basin (140, 220, 300, 630 km in diameter) were reported based on photo data. Numerous previous studies for Mare Moscovience (not Moscovience basin itself) have been carried out. These previous focused on describing geological context such as mare basalt flow units and volcanic histories.

According to the Kaguya topography model, the Moscovience basin has three distict ring structures. Innermost ring structure (about 180 km in diameter) is not perfect ring, which lack of northeast part. Middle ring structure (about 420 km in diameter) is very clear and perfect ring. Outermost ring structure (about 620 km in diameter) is obtuse than middle ring. These three rings are not concentric. The centers of three rings are located on a single line. It is suggest that the Moscovience basin formed by inclined impact.

On the other hand, according to the Kaguya gravity and crustal thickness model shows the Moscovience basin has extremely large (both width and height) mantle plug. Spatial size of mantle plug of the Moscovience basin is almost same size of that of the Freundlich-Sharanov basin that has 600 km diameter main ring. Moreover, height of mantle plug of the Moscovience is much higher then that of the Freundlich-Sharanov basin. These features are hard to explain by single inclined impact story. We propose a new idea for the Moscovience basin formation that is double-impact formation hypotheses.

In this talk, we describe characteristic of the Moscovience basin structures. We summarize two different story of Moscovience basin formation, and then we try to judge which story is more probable.

Keywords: Moscovience Basin, Impact Basin, Double Impact, Inclined Impact