Igneous and impacting structure of the Schrödinger crater

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[Abstract]

The very large lunar impact crater Schrödinger is a middle scale far-side polar area multiring basin discovered in Luna and Apollo era[1,2]. Its shows very regular centro-symmetric structure, with a complete multi-layer outer rim in diameter about 320km. It contains a ring of mountain peaks inside the basin. In rescent exploration, Matsumoto et al. [3] and Ping et al. [4] found its a typical Free-air and Bouguer anomaly area. Regional comparisons of Chang'E-1 and SELENE topography, free-air gravity anomaly, and Bouguer gravity anomaly reveal features that inform understanding of lunar structure and evolution. The observed gravitational structure implies that there is a density deficit under the floor due to less dense, surface material filling the interior of Schrödinger, and to thickened crust produced by sub-isostatic depression of the crust–mantle boundary.

The LRO image data of Schrödinger shows clear indication of volcanism. In fact, Schrödinger is famous for a small, dark volcanic vent (the keyhole-shaped crater marked by a red arrow) found on the basin floor. In addition, the slope prosses of impact basin rim is an imporint index of post activity processing on the surface of the moon[5]. The landslipe phenomenon can be seen from the Schrödinger impact basin edge to the bottom in the high resolution image data, which indicates the geological movement and change during a long history after the formation of the impact basin.

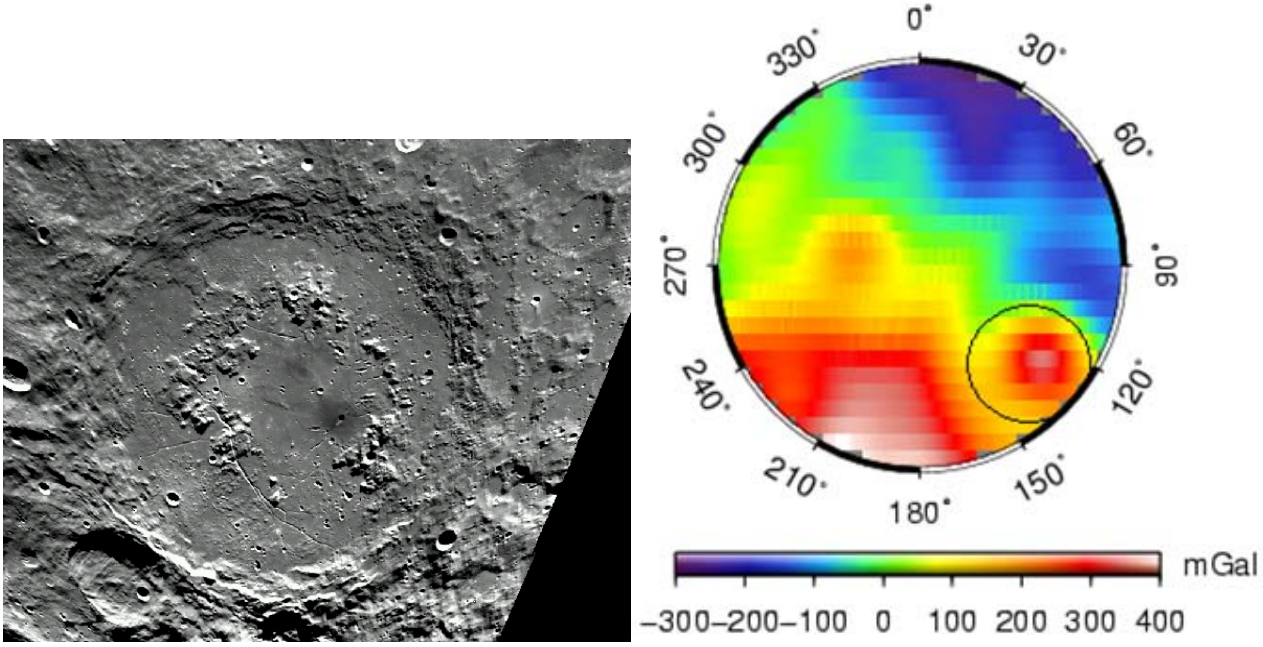

Fig.1 Schrödinger Crater: left, image by NASA Clementine spacecraft; right, Bougueur Anomaly

The igneous protruding stracture presents circular distribution at the bottom center of Schrödinger impact basin, which indicates that this area has formed on the basis of the original impact following by a combining effects of volcanic activity and subsequent multiple impacts. Surrounding the igneous protruding structure there are many fissures, which are believed to be formed when lava flows movement. A volcanic cone of well-preserved struacture and external morphology locates in the bottom right of the central

ring structure, the tapered wall and the top of the cone forms a gentle slope configuretoin. Around the volcanic cone dark matter distribution in the lunar surface, may be due to the volcanic eruption and lava Bay spread to the surrounding area.

Mini-SAR of LROC [6-8] acquired several image strips of the basin floor, including coverage of the dark material surrounding this vent. Those dark deposits are also "radar dark," indicating that this material is very fine-grained. These properties – first revealed by Mini-SAR – are expected of dark, volcanic ash, magma erupted through explosive, fire-fountain eruptions on the moon many billions of years ago. Detail research for the Schrödinger impact basin is under analysis.

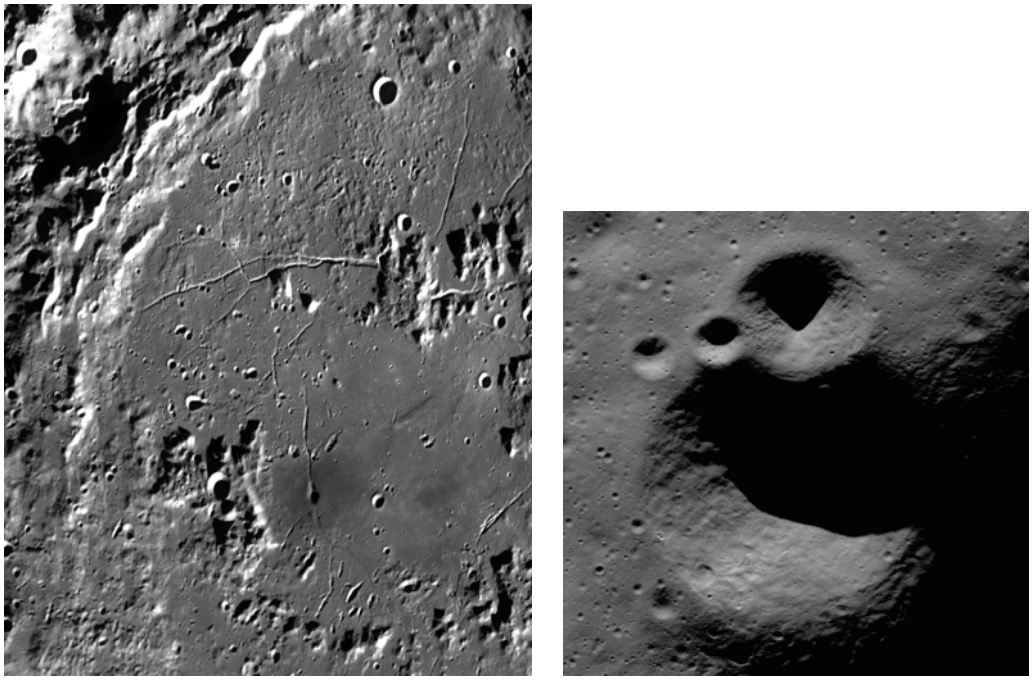

Fig.2 Dark volcanic vent at bottom of Schrödinger basin: left, Clementine mosaics. ISRO/NASA/ JHUAPL/LPI; right, NAC Frame M108313384R, view is 785 m across [NASA/GSFC/Arizona State University].

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