VOLCANIC ACTIVITY OF THE MARE MOSCOVIENSE AND SCHRÖDINGER BASIN. LU Yangxiaoyi[1]. PING Jinsong[1, 3], V.V. Shevchenko[2] , SU Xiaoli [3]. ([1]National Astronomical Observatories, Chinese Academy of Sciences, Beijing, China. lyxy@bao.ac.cn,), ([2] Sternberg State Astronomical Institute, Moscow Lomonosov University, Moscow, Russia.), ([3] University of Chinese Academy of Sciences).

Introduction: We used data from the Chang'E-1 and LRO.The Moscoviense basin is the most prominent mare basalt filled multi-ring im- pact formation on the lunar farside highlands. Mare basalt of Mare Moscoviense is divided into a few individual basalt flows. Schrödinger is a very large impact crater, 320 kilometers (198.5 miles) in diameter, that scientists call a "basin." Schrödinger is famous for a small, dark volcanic vent (the keyhole-shaped crater marked by a red arrow) found on the basin floor.

Schordinger Basin: The very large lunar impact crater Schrödinger is a middle scale far-side polar area multiring basin discovered in Luna and Apollo era. 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. [1] and Ping et al. [2] 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[3]. 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.

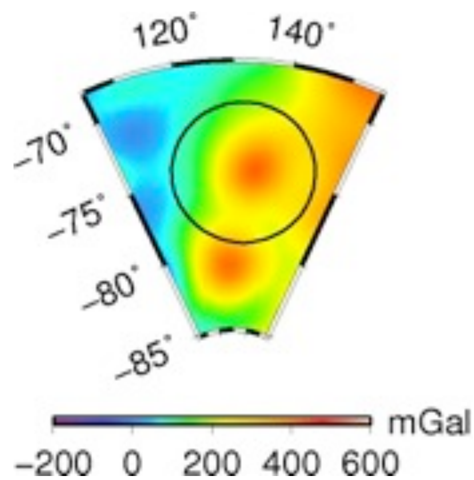

Fig.1 Bouguer gravity map of area Schordinger Basin by gravity data of Chang'E-1.

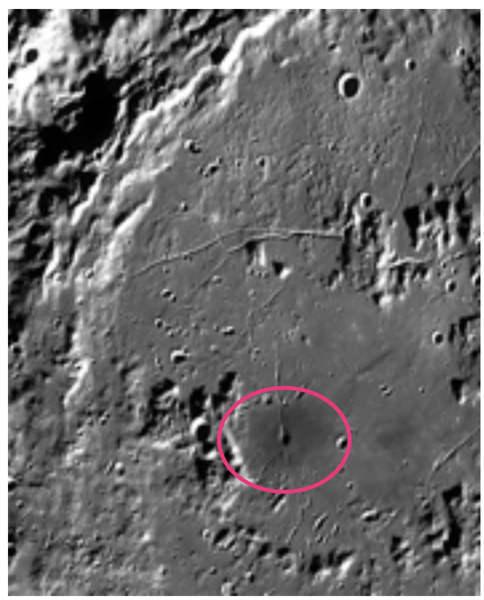

Fig.2 Dark volcanic vent at bottom of Schrödinger basin: left, Clementine mosaics. ISRO/NASA/ JHUAPL/LPI

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 [4-6] 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.

Volcanic activity of Moscoviense The Moon Mineralogy Mapper (M3) team identified unusual mineralogical exposures. Other studies of the Moscoviense basin have identified several unusual features of this farside formation. It is one of the few farside formation that has abundant mare deposits. Moreover, number of works are consider the Moscoviense basin as having the thinnest crust on the entire Moon [7]. Morota et al. [8] proposed that thickness equal ~ 600 m is the lower limit of the total thick- ness of mare basalts in Mare Moscoviense (SELENE (Kaguya) data). They presumed that the total thickness is less than 1 km, because the crater density of the flooded craters is roughly as high as the density of large craters in the highland unit of Moscoviense basin, suggesting that most large post Moscoviense basin craters survive the subse- quent mare flooding. The age of Moscoviense basin is estimated to be ~4.1 Ga. According to the stratig- raphy of Neukum & Ivanov [9], this is classified as a Nectarian system, which is consistent with the classification of Wilhelms [10]. Morota et al. [8] consider that oldest unit of mare basalts in Mare Moscoviense is observed in the southern part and have a model age of 3.9 Ga. The mare basalt of this unit is thicker than 100 m. According to cumulative crater size-frequency distributions obtained in [8] the depression area above mentioned is most young basaltic flow which has age of 2.6 Ga. In [8] the depression area is named as the eastern mare unit. Haruyama et al. reported that the layer of mare basalt in this unit is extremely unusual. Its thickness is ~ 40 m only.

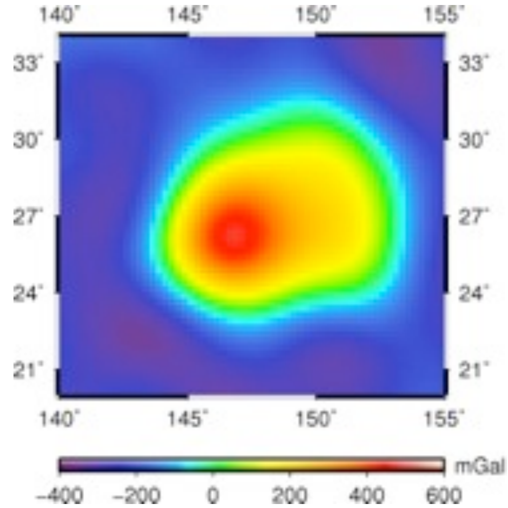

Fig.3 Bouguer gravity map of area Moscoviense Basin by gravity data of Chang'E-1. Red area's gravity vol. more than the other area (blue) ~ 600mGal.

Lunar basalts are concentrated on the nearside and occur in the interiors of many low-lying impact basin fillings and cover 17% or 7×106 km2 of the total lunar surface amounting to ~1% of the lunar crustal volume. (Head, 1976, Wilhelms et al., 1987 and Head and Wilson, 1992)The regions of basin Schrodinger are characterized by volcanoes whose morphologies are strongly analogous to volcanic landforms on Moscoviense.

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