

## Subsurface structure in Oceanus Procellarum based on the SELENE/LRS data

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Oceanus Procellarum (OP) is one of the largest lunar maria, and has many lava flow units with ~3.59 to ~1.20 Ga (i.e., giga annum) based on the crater chronology [Hiesinger et al., *JGR*, 2003]. This mare had been formed by the eruption from dyke before at least ~3.8 Gya (i.e., giga years ago) [Andrews-Hanna et al., *Science*, 2013]. OP is ~0.74 km in average depth based on the comparison of gravity and topography [Gong et al., *JGR*, 2016], and is less than ~1.5 km in maximum depth based on the observations of partially buried crater [e.g., De Hon, *LPSC*, 1978]. The thickness of lunar lava flow is ~30 to 60 m in average [Hiesinger et al., *GRL*, 2002]. The relatively young lava flows (< ~3 Ga), located in mid-latitude area of OP, contain a high titanium composition ( $\text{TiO}_2 > 6$  wt.%) [e.g., Wu et al., *JGR*, 2012], in which the radar sounding cannot explore the subsurface structure because the radar is strongly attenuated by the titanium [e.g., Pommerol et al., *GRL*, 2010]. On the other hand, the old lava flows (> ~3.4 Ga), located in north-latitude of OP, contain a low titanium composition ( $\text{TiO}_2 = 1.5$  to 6 wt.%) [e.g., Wu et al., *JGR*, 2012], so the radar sounding can explore the subsurface structure. Ono et al. [2009] showed two subsurface boundaries at ~160 m and ~340 m depths below the north of OP, and Kaku et al. [2017] succeeded to detecting the subsurface echoes from the shallow lava tube structure in Marius Hills on OP. However, the spatial distribution of subsurface boundary of OP has not been shown by the radar sounding data. This study shows the preliminary result of the spatial distribution of subsurface boundary based on the SELENE/Radar Lunar Sounder (LRS) data, and the subsurface structure will be discussed.

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