

Lunar and Martian lava tubes and explorations to them through their skylight holes

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Large and deep hole structures of a few tens to hundreds meter diameter and depth were discovered on Mars in the thermal emission data acquired by Mars Odyssey THEMIS and on the Moon in the SELENE (Kaguya) Terrain Camera visible image data, about 10 years ago. These are probably skylights of underlying caves produced by volcanic activities such as lava tube formation. Later, many hole structures and depression features as "pits" possibly associated to lava tubes have been identified on these celestial bodies in image data of orbiting explorers. Intact lava tube existence on the Moon are also suggested by gravity measurements by GRAIL and radar sounding experiments by SELENE (Kaguya).

The role of lava tube on the formation of vast terrains expanding on the Moon and Mars are scientifically interesting, though the study has not been sufficiently done. In addition, lava tubes and their skylight holes offers prominent environments to conduct scientific examination of the history of volcanic activities on the Mars and Moon. Lava tubes on Mars and the Moon are expected to be secure shelters for humans and instruments potentially protecting from micrometeorites bombardments and cosmic ray radiations, In the next decades, therefore, Martian and lunar lava tube exploration will be executed by space agencies of countries and even private companies.

In this presentation, we would introduce recent studies of lava tubes of Mars and the Moon and their explorations.

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