Exploration to lunar subsurface cavern and its skylight hole

*Junichi Haruyama[1], Takahiro Iwata[1], Yukio Yamamoto[1], Toshiyuki Nishibori[1]

1. Japan Aerospace Exploration Agency

In this presentation, we would survey recent research results for lunar lava tube and introduce our exploration plan to them.
We are aiming to return to the Moon to establish habitable bases on the Moon. However, the surface of the Moon is harsh environment: fatal radiation showers, wide temperature oscillation, and continuous micrometeorite bombardments and so on. On the contrary, subsurface void space such as lava tube where humans and instruments are protected from the harsh lunar environment seems one of the best candidates to establish lunar base. In addition to the potential habitability, lava tube is a treasure cave for science stocking many clues to solve lunar and planetary science issues. Since the discovery of a skylight hole on the Marius Hills on the Moon in 2009, nearly ten possible skylight holes have been found in the images of SELENE (Kaguya) Terrain Camera and LRO Narrow Angle Camera. However, it was difficult to say that each hole apparently connects to a large and long lava tube. Recently Kaku et al. (2018) investigated patterns of radar echo acquired by Lunar Radar Sounder onboard SELENE (Kaguya) and found a pattern at the Marius Hills suggesting existence of intact lava tubes. A possible lava tube was estimated its length to be 50km. We are now planning lunar lava tube through its skylight hole. The exploration was named “Unprecedented Zipangu Underworld of the Moon Exploration (UZUME)”.

Keywords: moon, hole, cavern, SELENE, UZUME, lava tube

