

火星地下氷探査のためのレーダサウンダー

Radar sounder for exploration of ices below the surface of the Mars

*熊本 篤志¹、臼井 寛裕²、黒川 宏之²、野口 里奈²、東 真太郎³、石山 謙⁴、土屋 史紀¹、宮本 英昭⁵、西堀 俊幸⁴、尾崎 光紀⁶、寺田 直樹¹、関 華奈子⁵、山崎 敦⁴

*Atsushi Kumamoto¹, Tomohiro Usui², Hiroyuki Kurokawa², Rina Noguchi², Shintaro Azuma³, Ken Ishiyama⁴, Fuminori Tsuchiya¹, Hideaki Miyamoto⁵, Toshiyuki Nishibori⁴, Mitsunori Ozaki⁶, Naoki Terada¹, Kanako Seki⁵, Atsushi Yamazaki⁴

1. 東北大学、2. 東京工業大学、3. 九州大学、4. 宇宙航空研究開発機構、5. 東京大学、6. 金沢大学

1. Tohoku University, 2. Tokyo Institute of Technology, 3. Kyushu University, 4. JAXA, 5. University of Tokyo, 6. Kanazawa University

Design of high resolution radar sounders onboard the rover for exploration of the ices below the surface of the Moon have been investigated.

In the polar regions of the Mars, there are thick ice layers called polar layered deposits, which were investigated in detail by radar sounders onboard the Mars Express [Orosei et al., 2015] and Mars Reconnaissance Orbiter [Phillips et al. 2008; Foss et al., 2017]. The presence of the ices in the polar region was also supported by theoretical studies [Clifford et al. 1993; Grimm et al., 2017]. On the other hand, the presence of the subsurface ices in low latitude regions is still being discussed. Some theoretical studies suggest that ice has been lost due to sublimation [Grimm et al., 2017] while some observations such as surface radar echoes [Mouginot et al., 2012; Castaldo et al., 2017] and gamma ray spectrometer [Feldman et al., 2004; Boynton et al., 2007] suggest the presence of the subsurface ice. Because the subsurface ice is considered to be thin in low latitude if it exists, we propose radar onboard the orbiter with an operation frequency of 50-150 MHz to perform global survey of the ice up to depth of 300 m at a resolution of 1.5 m, focusing on the shallower subsurface structures than the previous radar sounders' observations.

キーワード：地下レーダサウンダー

Keywords: subsurface radar sounder