

Callisto as a keystone to reproduce the formation process of the Jovian system

*関根 康人¹、鎌田 俊一²、青山 雄彦³、生駒 大洋³、谷川 享行⁴

*Yasuhito Sekine¹, Shunichi Kamata², Yuhiko Aoyama³, Masahiro Ikoma³, Takayuki Tanigawa⁴

1. 東京工業大学地球生命研究所、2. 北海道大学創成研究機構、3. 東京大学大学院理学系研究科、4. 一関高等工業専門学校
1. Earth-Life Science Institute, Tokyo Institute of Technology, 2. Creative Res. Institution, Hokkaido University, 3. Dept of Earth and Planetary Sci., University of Tokyo, 4. Nat'l Inst. Tech., Ichinoseki Col.

Callisto is the outermost Galilean satellite, with 2410 km of radius and 1.83 g/cc of density. The size and mass are comparable to those of another Jovian moon, Ganymede and the largest moon of Saturn, Titan. Unlike Ganymede and Titan, however, heavily-cratered Callisto may have experienced only limited geological activities since its formation. Owing to the low geological activities, Callisto may serve as a “fossil” of the Jovian system formation in the early Solar System. Volatile and isotope compositions of ice materials on Callisto would reflect ice compositions of the building materials of the Jovian satellites, which is critical to constrain the disk temperature of the formation region of proto-Jupiter as well as both shock heating and size of infalling materials onto proto-Jupiter. The interior structure, namely degree of differentiation, of Callisto is essential to constrain the inflow rate of the building materials from the protoplanetary disk. In this talk, we discuss the key observations, e.g., surface materials and interior structure of Callisto, in future missions to constrain the formation process of the Jovian system.

キーワード：氷衛星、太陽探査、惑星形成

Keywords: icy satellite, Solar System exploration, planetary formation