[EE] Evening Poster | P (Space and Planetary Sciences) | P-PS Planetary Sciences

[P-PS01]Outer Solar System Exploration Today, and Tomorrow

convener:Jun Kimura(Osaka University), Yasumasa Kasaba(Dep. Geophysics Graduate School of Science Tohoku University), Steven Vance(Jet Propulsion Laboratory, Caltech, 共同), Kunio M. Sayanagi (Hampton University)

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The giant planets provide many keys to understanding planetary processes. They play an important role in shaping our solar system, and the physical and chemical processes they harbor also provide a unique opportunity to study the phenomena relevant for studying
Earth and other planets, including exoplanetary systems. In this session, we discuss a wide range of topics encompassing the giant planets and their moons, including their origins, interiors, atmospheres, compositions, surface features, and electromagnetic fields. To advocate for current and future outer planets exploration (Cassini, Juno, New Horizons, JUICE, and beyond), we also call for discussions on future missions to explore giant planet systems, including how to develop better international cooperation. Discussion in this latter category will include progress in developing a solar sail mission concept for observing the Jupiter system and its trojan asteroids.

[PPS01-P05]Evolution of subsurface ocean and constraint for the interior in Pluto

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NASA's New Horizons spacecraft made its close flyby of Pluto on 2015 and has acquired surface images and unveiled a diverse range of landforms. Accurate determinations of Pluto's shape from imaging data suggest that Pluto is almost perfectly spherical and had or has a relatively warm interior (maybe an ocean) for the most part of its history. In addition, reorientation of Pluto arising from tidal and rotational torques implies that the subsurface ocean currently exists. Furthermore, Pluto’s surface has many extensional tectonic signatures, indicating that water ice–based crust has been experienced volume expansion event, e.g., gradually freezing of liquid water. Accurately measured value of Pluto’s radius and inferred bulk density of 1.854 g/cc indicates that Pluto has 30-35 wt% of water and volume ratio between water shell and rocky core could be changed depending on their densities if we assume that two components are perfectly differentiated (e.g., surficial water shell thickness changes several tens of kms depending on the rocky core density). Such difference might have a large impact for the water shell structure in terms of the pressure range, and high-pressure phase ice could be appeared above the rocky core surface in case of the thick water shell.

Considering such wide variety of interior structure according to the bulk density of Pluto’s surface radius, we performed the numerical simulation for the interior thermal history to discuss a constraint of the interior which is capable of sustaining the subsurface ocean at present.