

Exploration of Jupiter: Pursuing the Origin of Jupiter and Evolution of Satellites

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We started planning future Jupiter mission in 2020's. Origin of Jupiter and evolution of its satellites are important targets of the mission. Other targets are high energy process in Jovian magnetosphere and Jovian meteorology.

Jupiter is considered to have been formed by gas accretion through subdisk around the planet. And satellites should have been formed in the subdisk. Therefore, study of satellite compositions would provide a key for the disk evolution. We already know the ice/rock ratio is different among Galilean satellites.

Europa and Io (and previously Ganymede) would be representatives of bodies where tidal energy should be prevailing interior heat source. Europa and possibly Ganymede have subsurface ocean. Estimation of thickness of icy crust and salt composition and abundance in the ice and ocean are important target. Using amorphous/crystalline ratio on Europa, we can know the current ice eruption from subsurface. We are curious on Enceladus-type activity would occur on Europa or not.

Io is another interesting target because of its active volcanism. Lithosphere thickness of Io is not known. To measure gas and aerosol around Io is also important for the origin of high energy particles and super-velocity dust in the Jovian magnetosphere.