

Prospect of optical observation of planets from the ground at Tohoku University

Shoichi Okano[1], Hiroaki Misawa[2], Takeshi Sakanoi[3], Yukihiro Takahashi[4], Isao Murata[5]

[1] PPARC, Tohoku Univ., [2] Planet. Plasma and Atmos. Res. Cent., Tohoku Univ., [3] PPARC, Grad. School of Sci., Tohoku Univ., [4] Dept. Geophysics, Tohoku University, [5] Astronomy and Geophysics, Tohoku Univ.

Observation of planets with optical remote sensing from the ground is advantageous. It enables us to continuously monitor a global image of planet or even a huge space surrounding a planet. On the other hand, seeing condition due to atmospheric turbulence, limited spatial resolution, and the fact that observation in the ultraviolet region is impossible are disadvantageous for the ground observation. Observation of planets from a spacecraft is completely antipodal in its nature. The two methods are complementary each other, and they should contribute for the progress of planetary science inseparably.

Tendency of promoting planetary science seems to be rising in recent years in Japan. Mars observation by NOZOMI, or VCO mission for Venus and BeppiColombo project for Mercury are symbolizing such effort. We will discuss, presenting our current observation and future plan, how should the ground observation fill the role toward CAWSES.

We have been conducting imaging observations of plasma torus and sodium clouds originated from volcanic gas from Jovian satellite Io with an aim to clarify Jovian magnetosphere in the past years. A Fabry-Perot imager for observation of Doppler quantity distribution in Io's plasma torus is being developed now, and observation of sodium clouds using a new monochromatic imager has already been started. At our Iitate observatory, observation of Jupiter with a grating monochromator connected to a Coude focus of 60cm telescope is in progress. Detection of Ha aurora on Jupiter is challenged using a narrow-band interference filter, the monochromator and a Fabry Perot imager, utilizing their high spectral resolution for removing strong solar scattered light on the Jovian disk. In addition, we are making observation of the surface bounded atmosphere of the Moon or Mercury, using scattered sodium emission as a tracer. An FTIR spectrometer has recently been installed on the 60cm telescope for IR spectral observation of Venus. In the near future, imaging observation of Mars and Venus in the near infrared region is also planned.

Considering that ground observation in Japan is limited due to weather and atmospheric seeing conditions, we should start study of establishing a large telescope as a facility utilized collaboratory by universities in Japan at a suitable location such like Hawaii. Such a new facility will contribute for support observation of Japanese future planetary mission.