Oral | Symbol P (Space and Planetary Sciences) | P-CG Complex & General

[P-CG38_1PM2]Planetary atmosphere, ionosphere and magnetosphere

Convener:*Takeshi Imamura(Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science), Kanako Seki(Solar-Terrestrial Environment Laboratory, Nagoya University), Yukihiro Takahashi(Department of Cosmosciences, Graduate School of Science, Hokkaido University), Yoshiyuki O. Takahashi(Center for Planetary Science), Keiichiro Fukazawa(Research Institute for Information Technology,Kyushu University), Hiromu Nakagawa(Planetary Atmosphere Physics Laboratory, Department of Geophysics, Graduate School of Science, Tohoku University), Chair:Hiromu Nakagawa(Planetary Atmosphere Physics Laboratory, Department of Geophysics, Graduate School of Science, Tohoku University)

Thu. May 1, 2014 4:15 PM - 6:00 PM 423 (4F)

Studies of planetary atmospheres, ionospheres and magnetospheres will be presented and discussed. Results of ground-based observations, plans of spacecraft missions, and theoretical studies are welcome.

5:30 PM - 5:45 PM

[PCG38-P06_PG]Observing plan for planetary atmosphere using IR heterodyne spectroscopy in 2014

3-min talk in an oral session

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Keywords:infrared spectroscopy, heterodyne, laser, observation, planetary atmosphere, isotopes

We propose a new developed infrared heterodyne instrument, called Mid-Infrared LAser Heterodyne Instrument (MILAHI), for our dedicated telescope at the top of Mt. Haleakala, Hawaii. It addresses the key physical/meteorological parameters, such as the atmospheric temperature profiles, abundance profiles of the atmospheric compositions and their isotopes, and wind velocity. The observational sensitivity of MILAHI is discussed in this paper. The scientific target of MILAHI is to understand highly variable phenomena in the planetary atmospheres. The nature of atmospheric activity in various time-scale will be investigated by continuous monitoring with our dedicated telescope, in order to increase our understanding of planetary atmospheric dynamics, photochemistry, and meteorology. New measurements with high spatial/spectral resolutions constrain the three-dimensional distributions of temperature and compositions. The D/H and other isotopic ratios, diagnostic of the terrestrial atmosphere evolution, will be accurately measured in H_2O and CO_2. The atmospheric chemistry will be studied by monitoring O_3, H_2O_2, H_2O, and HDO. Mapping of the H_2O isotopes reveal the mechanism of complex interaction between regolith-aerosols-atmosphere-polar caps on Mars. Direct measurements of wind velocity and temperature allow the first monitoring of the middle atmosphere oscillations to investigate the effects of the gravity waves from the lower atmosphere on the upper atmosphere for various seasons and dust loadings. A number of organics molecule bands in the mid-infrared regime will be accurately measured in planetary/cometary/stellar atmospheres. In addition to these interconnected objectives, serendipitous searches with our advantage of dedicated use for astronomical/atmospheric transient events which occur at frequent and unpredictable intervals (e.g. dust storm) will enhance our knowledge of the composition and dynamics of the astronomical sources.