TAKEHIKO SATOH

PERSONAL DATA

Born in Tokyo, Japan, on 5th December 1962.

CURRENT ADDRESS

Department of Solar System Sciences
Institute of Space and Astronautical Science (ISAS),
Japan Aerospace Exploration Agency (JAXA)
3-1-1 Yoshinodai, Chuo-ku, Sagamihara-shi
Kanagawa 252-5210, Japan
Phone: +81 70 1170 2759, FAX: +81 42 759 8178
E-mail: satoh@stp.isas.jaxa.jp

EDUCATIONAL BACKGROUND

Doctor of Science in Physics, awarded March 1992 (Science University of Tokyo).
Master of Science in Physics, awarded March 1989 (Science University of Tokyo).
Bachelor of Science in Physics, awarded March 1987 (Science University of Tokyo).

PROFESSIONAL EMPLOYMENT

Professor, Department of Solar System Sciences, Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency, Sagamihara-shi, Kanagawa, Japan, December 2006 – present.

Professor, Department of Space and Astronautical Science, School of Physical Sciences, SOKENDAI, Sagamihara-shi, Kanagawa, Japan, December 2006 – present.

Visiting Professor, Department of Cosmosciences, Graduate School of Science, Hokkaido University, Sapporo-shi, Hokkaido, Japan, April 2009 – present.

Associate Professor, Faculty of Education, Kumamoto University, Kumamoto-shi, Kumamoto, Japan, May 2001 – November 2006.

Lecturer, Frontier Research Center for Computational Sciences, Science University of Tokyo Noda-shi, Chiba, Japan, April 1997 – April 2001.

Astrophysicist, Hughes STX Corporation at NASA Goddard Space Flight Center, Greenbelt, Maryland, USA, October 1993 – March 1997.

Visiting Scientist, Institute for Astronomy, University of Hawaii, Honolulu, Hawaii, USA April 1992 – April 1993, and June 1993 – September 1993.

RESEARCH PROJECTS

Project Scientist, Venus Climate Orbiter (Akatsuki), JAXA

July 2016 – present.

Principal Investigator, IR2 (2-μm) camera onboard Venus Climate Orbiter (Akatsuki), JAXA

April 2001 – present.

Interdisciplinary Scientist, Venus Express, ESA

2006 – 2014.

Discipline Scientist, International Space Science Institute, Beijing (ISS-BJ),

2021 – present.

Co-Investigator, Martian Moon Explorer (MMX) mission, atmospheric science, JAXA

2017 – present.

Co-Investigator, EnVision/VenSpec(-M), ESA

2020 – present.

RESEARCH INTERESTS

Planetary atmospheres, magnetospheres, and surfaces. Atmospheric dynamics and aerosol processes on major planets, such as Jupiter, Venus and Mars. Radiative transfer in planetary and stellar atmospheres. Variable phenomena in jovian planets: changes in clouds, large-scale disturbances, and auroral emissions. Single and multiple light-scattering theories and computational techniques. Instrument development for space missions and ground-based observations.

HONORARY AND PROFESSIONAL SOCIETY

One-year support of the research in residence at the University of Hawaii by Yamada Science Foundation (February 1992).

Research Aid of Inoue Foundation for Science (February 1994).

Asia Oceania Geosciences Society (Solar & Terrestrial Section Vice-President for 2011-2012; Section President for 2012-2014; Section Vice-President for 2014-2015; Assistant Secretary General for 2017-2018; Secretary General for 2018-2020; Assistant Secretary General for 2020 – present).

American Geophysical Union.

Division for Planetary Sciences, American Astronomical Society.

Society of Geomagnetism and Earth, Planetary and Space Sciences.

Japan Society of Planetary Sciences.

Astronomical Society of Japan.

Society of Japan Science Teaching

SELECTED PUBLICATIONS

[1] Fukuya, K., T. Imamura, M. Taguchi, T. Fukuhara, T. Kouyama, T. Horinouchi, J. Peralta, M. Futaguchi, T. Yamada, T.M. Sato, A. Yamazaki, S. Murakami, T. Satoh, M. Takagi, and M. Nakamura. Unveiling of nightside cloud-top circulation of Venus atmosphere, *Nature,* **595,** 511–515, https://doi.org/10.1038/s41586-021-03636-7, 2021.

[2] Satoh, T., C.W. Vun, M. Kimata, T. Horinouchi, and T.M. Sato. Venus night-side photometry with “cleaned” Akatsuki/IR2 data: Aerosol properties and variations of carbon monoxide. *Icarus,* **335,** 114134, https://doi.org/10.1016/j.icarus.2020.114134, 2021.

[3] Lee, Y.J., A. Garcia Munoz, T. Imamura, M. Yamada, T. Satoh, A. Yamazaki, and S. Watanabe. Brightness modulations of our nearest terrestrial planet Venus reveal atmospheric super-rotation rather than surface features. *Nature Communications,* **11,** 5720, 2020.

[4] Sato, T.M., T. Satoh, H. Sagawa, N. Manago, Y.J. Lee, S. Murakami, K. Ogohara, G.L. Hashimoto, Y. Kasaba, A. Yamazaki, M. Yamada, S. Watanabe, T. Imamura, and M. Nakamura. Dayside cloud top structure of Venus retrieved from Akatsuki IR2 observations. *Icarus,* **345,** 113682, https://doi.org/10.1016/j.icarus.2020.113682, 2020.

[5] Horinouchi, T., Y.-Y. Hayashi, S. Watanabe, M. Yamada, A. Yamazaki, T. Kouyama, M. Taguchi, T. Fukuhara, M. Takagi, K. Ogohara, S. Murakami, J. Peralta, S.S. Limaye, T. Imamura, M. Nakamura, T.M. Sato, and T. Satoh. How waves and turbulence maintain the super-rotation of Venus’ atmosphere. *Science,* **368,** 405-409, https://doi.org/10.1126/science.aaz4439, 2020.

[6] Kouyama, T., M. Taguchi, T. Fukuhara, T. Imamura, T. Horinouchi, T. M. Sato, S. Murakami, G. L. Hashimoto, Y.-J. Lee, M. Futaguchi, T. Yamada, M. Akiba, T. Satoh, M. Nakamura, Global structure of thermal tides in the upper cloud layer of Venus revealed by LIR onboard Akatsuki, *Geophys. Res. Lett.,* **46,** 9457-9465, https://doi.org/10.1029/2019GL083820, 2019.

[7] Peralta, J., A. Sánchez-Lavega, T. Horinouchi, K. McGouldrick, I. Garate-Lopez, E. F. Young, M. A. Bullock, Y.-J. Lee, T. Imamura, T. Satoh, S. S. Limaye, New cloud morphologies discovered on the Venus's night during Akatsuki, *Icarus,* **333,** 177-182, doi:10.1016/j.icarus.2019.05.026, 2019.

[8] Kashimura, H., N. Sugimoto, M. Takagi, Y. Matsuda, W. Ohfuchi, T. Enomoto, K. Nakajima, M. Ishiwatari, T. M. Sato, G. L. Hashimoto, T. Satoh, Y. O. Takahashi, Y.-Y. Hayashi, Planetary-scale streak structure reproduced in high-resolution simulations of the Venus atmosphere with a low-stability layer, *Nature Communications,* **10,** Article number: 23, doi:10.1038/s41467-018-07919-y, 2019.

[9] Stallard, T.S., Burrell, A.G., Melin, H. et al. Identification of Jupiter’s magnetic equator through H_3^+ ionospheric emission. *Nature Astronomy,* **2,** 773–777, doi:10.1038/s41550-018-0523-z, 2018.

[10] Horinouchi, T., S. Murakami, T. Satoh, J. Peralta, K. Ogohara, T. Kouyama, T. Imamura, H. Kashimura, S. S. Limaye, K. McGouldrick, M. Nakamura, T. M. Sato, K. Sugiyama, M. Takagi, S. Watanabe, M. Yamada, A. Yamazaki, E. F. Young, Equatorial jet in the lower to middle cloud layer of Venus revealed by Akatsuki, *Nature Geoscience,* **10,** 646-651, doi:10.1038/ngeo3016, 2017.

[11] Satoh, T., T. M. Sato, M. Nakamura, Y. Kasaba, M. Ueno, M. Suzuki, G. L. Hashimoto, T. Horinouchi, T. Imamura, A. Yamazaki, T. Enomoto, Y. Sakurai, K. Takami, K. Sawai, T.

Nakakushi, T. Abe, N. Ishii, C. Hirose, N. Hirata, M. Yamada, S. Murakami, Y. Yamamoto, T. Fukuhara, K. Ogohara, H. Ando, K. Sugiyama, H. Kashimura, S. Ohtsuki, Performance of Akatsuki/IR2 in Venus orbit: the first year, *Earth, Planets and Space,* **69,** 154, doi:10.1186/s40623-017-0736-x, 2017.

[12] Stallard, T. S., Melin, H., Miller, S., Moore, L., O'Donoghue, J., Connerney, J. E. P., Satoh, T., West, R. A., Thayer, J. P., Hsu, V. W., and Johnson, R. E. The great cold spot in Jupiter's upper atmosphere. *Geophys. Res. Lett.* **44** (7), 3000-3008, DOI: 10.1002/2016GL071956, 2017.

[13] Satoh, T., Nakamura, M., Ueno, M., Uemizu, K., Suzuki, M., Imamura, T., Kasaba, Y., Yoshida, S., and Kimata, M. Development and in-flight calibration of IR2: 2-μm camera onboard Japan's Venus orbiter, Akatsuki. *Earth, Planets and Space,* 68:74, DOI: 10.1186/s40623-016-0451-z, 2016.

[14] Satoh, T., Ohtsuki, S., Iwagami, N., Ueno, M., Uemizu, K., Suzuki, M., Hashimoto, G. L., Sakanoi, T., Kasaba, Y., Nakamura, R., Imamura, T., Nakamura, M., Fukuhara, T., Yamazaki, A., Yamada, M., Venus' clouds as inferred from the phase curves acquired by IR1 and IR2 on board Akatsuki, *Icarus,* **248:**213–220, doi:10.1016/j.icarus.2014.10.030, 2015.

[15] Takao M. Sato, Takehiko Satoh and 8 co-authors. Cloud top structure of Venus revealed by Subaru/COMICS mid-infrared images. *Icarus,* **243:**386-399, 2014.

[16] Kouyama, T.; Imamura, T.; Nakamura, M.; Satoh, T.; Futaana, Y., Long-term variation in the cloud-tracked zonal velocities at the cloud top of Venus as deduced from Venus Express VMC images. *J. Geophys. Res.,* **118(1),** DOI: 10.1029/2011JE004013, 2013.

[17] Takehiko Satoh, Takeshi Imamura, G. L. Hashimoto, Naomoto Iwagami, Kazuaki Mitsuyama, Satoko Sorahana, Pierre Drossart, and Giuseppe Piccioni. Cloud structure in venus middle-to-lower atmosphere as inferred from VEX/VIRTIS 1.74-μm data. J*ournal of Geophysical Research,* **114,** E00B37, doi:10.1029/2008JE003184, 2009.

[18] Takehiko Satoh and J.E.P. Connerney. Jupiter's H_3^+ emissions viewed in corrected jovimagnetic coordinates. *Icarus,* **141:**236–252, 1999.

[19] Takehiko Satoh and J.E.P. Connerney. Spatial and temporal variations of Jupiter's H_3^+ emissions deduced from image analysis. *Geophysical Research Letters,* **26:**1789–1792, 1999.

[20] J.E.P. Connerney, Mario Acuna, Norman Ness, and Takehiko Satoh. New models of Jupiter's magnetic field constrained by the Io flux tube footprint. *Journal of Geophysical Research,* **103:**11929–11939, 1998.

[21] Takehiko Satoh, J.E.P Connerney, and Richard Baron. Emission source model of Jupiter's H_3^+ aurorae: A generalized inverse analysis of images. *Icarus,* **122:**1–23, 1996.

[22] Takehiko Satoh and Kiyoshi Kawabata. A change of upper cloud structure in Jupiter's South Equatorial Belt during the 1989–1990 event. *Journal of Geophysical Research,* **99:**8425–8440, 1994.

[23] J.E.P. Connerney, Richard Baron, Takehiko Satoh, and Tobias Owen. Images of excited H_3^+ at the foot of the Io flux tube in Jupiter's atmosphere. *Science,* **262:**1035–1038, 1993.

[24] Takehiko Satoh and Kiyoshi Kawabata. Methane band photometry of the faded South Equatorial Belt of Jupiter. *Astrophysical Journal,* **384:**298–304, 1992.