Curriculum Vitae

Full Name: Kentaroh Suzuki
Gender: Male
Nationality: Japanese (Lawful Permanent Resident in the United States)

Education:
September 2004: Ph.D in Earth and Planetary Science, University of Tokyo
March 2000: Master of Science in Earth and Planetary Science, University of Tokyo
March 1998: Bachelor of Science in Geophysics, Tohoku University

Research Career:
August 2011--Present: *NASA Jet Propulsion Laboratory, California Institute of Technology*
Scientist III
February 2007--August 2011: *Department of Atmospheric Science, Colorado State University*
Research Scientist II (January 2009 -- August 2011)
Postdoctoral Researcher (February 2007 -- December 2008)
October 2004--February 2007: *Center for Climate System Research, University of Tokyo*
Postdoctoral Researcher

Awards/Honors:
JPL Explorer Award for Scientific and Technical Excellence, NASA JPL (2014) "*For groundbreaking research and publications on climate model evaluation and development using satellite observations of cloud processes*"
Society Award, Meteorological Society of Japan (2014) "*Studies on microphysical properties of low-level clouds with novel methodologies*"
The Most Accessed Article in Journal of the Atmospheric Science, American Meteorological Society (Sep 2011-Sep 2012) "*Diagnosis of the warm rain process in cloud-resolving models using joint CloudSat and MODIS observations*"
Research Grant for Young Scientists, Japan Prize Foundation (2006) "*A study of aerosol-cloud interactions with numerical modeling of cloud microphysical processes*"

Membership of Academic Societies:
American Meteorological Society
American Geophysical Union
Meteorological Society of Japan

Short Bio:
Kentaroh (Kenta) Suzuki is a research scientist at NASA's Jet Propulsion Laboratory (JPL). His research focuses on cloud microphysics, aerosol-cloud interactions and their effects on Earth's climate with combined use of satellite observations and numerical modeling. His doctoral work at the University of Tokyo was devoted to climate modeling and detailed cloud microphysics modeling of aerosol-cloud interactions. After graduation, he participated in development of the first-ever aerosol-coupled global cloud-resolving model, NICAM-SPRINTARS, on Earth Simulator. As a postdoctoral researcher at Colorado State University, he began using satellite observations to study cloud microphysics. Since joining JPL, he has been conducting researches of exploiting multi-sensor satellite observations to evaluate numerical climate/cloud models. Recently, he has also been engaged in development of a process-scale numerical cloud model that is capable of representing detailed interactions among aerosols, microphysics and turbulence by implementing his cloud microphysics computation module into a Large-Eddy Simulation model developed at JPL.

Publications:

Peer-reviewed Journal Articles

[30] Kaul, C. M., J. Teixeira, and **K. Suzuki**, 2014: Sensitivities in large eddy simulations of mixed-phase Arctic stratocumulus clouds using a simple microphysics approach. *Mon. Wea. Rev*., to be submitted.

[29] **Suzuki, K.**, G. L. Stephens, A. Bodas-Salcedo, M. Wang, J.-C. Golaz, T. Yokohata, and T. Koshiro, 2014: Evaluation of the warm rain formation process in global models with satellite observations. *J. Atmos. Sci*., submitted.

[28] Kawamoto, K., and **K. Suzuki**, 2014: Distributional correspondence of 94-GHz radar reflectivity with the variation in water cloud properties over the northwestern Pacific and China. *J. Quant. Spec. Rad. Trans.,* in revision.

[27] Christensen, M. W., **K. Suzuki**, B. Zambri, and G. L. Stephens, 2014: Ship-track observations of a reduced shortwave indirect effect in mixed-phase clouds. *Geophys. Res. Lett*., accepted.

[26] Kuba, N., T. Hashino, M. Satoh, and **K. Suzuki**, 2014: Relationships between layer-mean radar reflectivity and columnar effective radius of warm cloud: Numerical study using a cloud microphysical bin model. *J. Geophys. Res. Atmos.*, doi:10.1002/2013JD020276, in press.

[25] **Suzuki, K.**, J.-C. Golaz, and G. L. Stephens, 2013: Evaluating cloud tuning in a climate model with satellite observations. *Geophys. Res. Lett.*, **40**, 4464-4468, doi:10.1002/grl.50874.

[24] Nagao, T. M., **K. Suzuki**, and T. Y. Nakajima, 2013: Interpretation of multiwavelength-retrieved droplet effective radii for warm water clouds in terms of in-cloud vertical inhomogeneity by using a spectral bin microphysics cloud model. *J. Atmos. Sci*., **70**, 2376-2391, DOI:10.1175/JAS-D-12-0225.1.

[23] Dodson, J. B., D. A. Randall, and **K. Suzuki**, 2013: Comparison of observed and simulated tropical cumuliform clouds by CloudSat and NICAM. *J. Geophys. Res. Atmos*, **118**, 1852-1867, doi:10.1002/jgrd.50121.

[22] Kawamoto, K., and **K. Suzuki**, 2013: Comparison of water cloud microphysics over mid-latitude land and ocean using CloudSat and MODIS observations. *J. Quant. Spec. Rad. Trans.*, **122**, 13-24.

[21] **Suzuki, K.**, G. L. Stephens, and M. D. Lebsock, 2013: Aerosol effect on the warm rain formation process: Satellite observations and modeling. *J. Geophys. Res. Atmos.*, **118**, 170-184, doi:10.1002/jgrd.50043.

[20] Kawamoto, K., and **K. Suzuki**, 2012: Microphysical transition in water clouds over the Amazon and China derived from space-borne radar and radiometer data. *J. Geophys. Res*., **117**, D05212, doi:10.1029/2011JD016412.

[19] Sato Y., **K. Suzuki**, T. Iguchi, I.-J. Choi, H. Kadowaki, and T. Nakajima, 2012: Characteristics of correlation patterns between droplet radius and optical thickness of warm clouds simulated by a three dimensional regional-scale spectral bin microphysics cloud model. *J. Atmos. Sci*., **69**, 484-503.

[18] **Suzuki, K.**, G. L. Stephens, S. C. van den Heever, and T. Y. Nakajima, 2011: Diagnosis of

the warm rain process in cloud-resolving models using joint CloudSat and MODIS observations. *J. Atmos. Sci*., **68**, 2655-2670.

[17] Stephens, G. L., T. L'Ecuyer, R. Forbes, A. Gettleman, J.-C. Golaz, A. Bodas-Salcedo, **K. Suzuki**, P. Gabriel, and J. Haynes, 2010: Dreary state of precipitation in global models. *J. Geophys. Res.*, **115**, D24211, doi: 10.1029/2010JD014532.

[16] **Suzuki, K.**, T. Nakajima, T. Y. Nakajima and G. L. Stephens, 2010: Effect of the droplet activation process on microphysical properties of warm clouds. *Environ. Res. Lett*., **5**, 024012.

[15] **Suzuki, K.**, T. Y. Nakajima, and G. L. Stephens, 2010: Particle growth and drop collection efficiency of warm clouds as inferred from joint CloudSat and MODIS observations. *J. Atmos. Sci.*, **67**, 3019-3032.

[14] Nakajima, T. Y., **K. Suzuki**, and G. L. Stephens, 2010b: Droplet growth in warm water clouds observed by the A-Train. Part II: A multi-sensor view. *J. Atmos. Sci*., **67**, 1897-1907.

[13] Nakajima, T. Y., **K. Suzuki**, and G. L. Stephens, 2010a: Droplet growth in warm water clouds observed by the A-Train. Part I: Sensitivity analysis of the MODIS-derived cloud droplet sizes. *J. Atmos. Sci*., **67**, 1884-1896

[12] **Suzuki, K**., T. Nakajima, T. Y. Nakajima and A. P. Khain, 2010: A study of microphysical mechanisms for correlation pattern between droplet radius and optical thickness of warm clouds with a spectral bin microphysics cloud model. *J. Atmos. Sci.*, **67**, 1126-1141.

[11] **Suzuki, K**., and G. L. Stephens, 2009b: A possible use of multi-sensor satellite observations for inferring the drop collection efficiency of warm clouds. *SOLA*, **5**, 125-128.

[10] Sato, Y., T. Nakajima, **K. Suzuki**, and T. Iguchi, 2009: Application of a Monte Carlo integration method to collision and coagulation growth processes of hydrometeors in a bin-type model. *J. Geophys. Res.*, **114**, D09215, doi: 10.1029/2008JD011247.

[9] **Suzuki, K**., and G. L. Stephens, 2009a: Relationship between radar reflectivity and the time scale of warm rain formation in a global cloud-resolving model. *Atmos. Res.*, **92**, 411-419.

[8] **Suzuki, K**., T. Nakajima, M. Satoh, H. Tomita, T. Takemura, T. Y. Nakajima, and G. L. Stephens, 2008: Global cloud-system-resolving simulation of aerosol effect on warm clouds. *Geophys. Res. Lett*., **35**, L19817, doi:10.1029/2008GL035449.

[7] Stephens, G. L., D. Vane, S. Tanelli, E. Im, S. Durden, M. Rokey, D. Reinke, P. Partain, G. Mace, R. Austin, T. L'Ecuyer, J. Haynes, M. Lebsock, **K. Suzuki**, D. E. Waliser, D. Wu, J. Kay, A. Gettleman, Z. Wang, 2008: The CloudSat Mission: Performance and early science after the first year of operation. *J. Geophys. Res*., **113**, D00A18, doi:10.1029/2008JD009982.

[6] Iguchi, T., T. Nakajima, A. P. Khain, K. Saito, T. Takemura, and **K. Suzuki**, 2008: Modeling the influence of aerosols on cloud microphysical properties in the East Asia region using a mesoscale model coupled with a bin-based cloud microphysics scheme. *J. Geophys. Res*., **113**, D14215, doi:10.1029/2007JD009774.

[5] **Suzuki, K**., and G. L. Stephens, 2008: Global identification of warm cloud microphysical processes with combined use of A-Train observations. *Geophys. Res. Lett*., **35**, L08805, doi:10.1029/2008GL033590.

[4] **Suzuki, K**., T. Nakajima, T. Y. Nakajima, and A. Khain, 2006: Correlation pattern between

effective radius and optical thickness of water clouds simulated by a spectral bin microphysics cloud model. *SOLA*, **2**, 116-119.

[3] **Suzuki, K**., T. Nakajima, A. Numaguti, T. Takemura, K. Kawamoto, and A. Higurashi, 2004: A study of the aerosol effect on a cloud field with simultaneous use of GCM modeling and satellite observation. *J. Atmos. Sci.*, **61**, 179-194.

[2] Sekiguchi, M., T. Nakajima, **K. Suzuki**, K. Kawamoto, A. Higurashi, D. Rosenfeld, I. Sano, and S. Mukai, 2003: A study of the direct and indirect effects of aerosols using global satellite data sets of aerosol and cloud parameters. *J. Geophys. Res.*, **108(D22)**, 4699, doi:10.1029/2002JD003359.

[1] Masunaga, H., T. Y. Nakajima, T. Nakajima, M. Kachi, and **K. Suzuki**, 2002: Physical properties of maritime low clouds as retrieved by combined use of Tropical Rainfall Measuring Mission (TRMM) Microwave Imager and Visible/Infrared Scanner, 2. Climatology of warm clouds and rain. *J. Geophys. Res.*, **107(D19)**, 4367, doi:10.1029/2001JD001269.

Review Articles (peer-reviewed)

[2] **Suzuki, K**., 2009: A study of aerosol indirect effect with a global cloud-resolving model, *Journal of Aerosol Research, Japan*, **24**, 250-255. (in Japanese)

[1] **Suzuki, K**., 2003: Review in climate modeling of aerosol indirect effect. *Journal of Aerosol Research, Japan*, **18**, 253-256. (in Japanese)

Conference Proceedings

[11] Kawamoto, K., and **K. Suzuki**, 2013: Difference in fractional occurrence of precipitation categories in terms of cloud properties. *Radiation Processes in the Atmosphere and Ocean (IRS2012)*, AIP Conf. Proc. 1531, 424-427, doi:10.1063/1.4804797.

[10] Nakajima, T. Y., T. M. Nagao, H. Letu, H. Ishida and **K. Suzuki**, 2012: On the cloud observations in JAXA's next coming satellite missions. *Proc. SPIE*, **8523**, *Remote Sensing of the Atmosphere, Clouds, and Precipitation IV,* 852316 (November 13, 2012); doi:10.1117/12.977250.

[9] Matsui, T. N., **K. Suzuki**, T. Y. Nakajima, H. Letu, 2011: Interpretation of multi-wavelength-retrieved cloud droplet effective radii in terms of cloud vertical inhomogeneity using a spectral-bin microphysics cloud model and the radiative transfer computation. *Proc. Geoscience and Remote Sensing Symposium (IGARSS) IEEE 2011 International*, 3229-3232.

[8] Nakajima, T. Y., T. N. Matsui, H. Letu, H. Shimoda, **K. Suzuki**, G. L. Stephens, H. Ishida, N. Kikuchi, and T. Nakajima, 2010: Cloud sciences using satellite remote sensing, cloud growth model, and radiative transfer. *Proc. SPIE*, **7859**, *Remote Sensing of the Atmosphere and Clouds III,* 785905 (October 28, 2010); doi:10.1117/12.869436.

[7] **Suzuki, K.**, G. L. Stephens, T. Y. Nakajima, and S. C. van den Heever, 2009: Multi-sensor analysis of A-Train observations for investigating the warm cloud microphysical processes. *Proc. AMS 34th Conference on Radar Meteorology*, J7B.3, 155680.

[6] Nakajima, T. Y., **K. Suzuki**, T. Takemura, and T. Nakajima, 2008: Cloud growth process appeared in the global scale distribution of the cloud optical and microphysical properties retrieved from the satellite remote sensing. *Proc. SPIE*, **7152**, *Remote Sensing of the*

Atmosphere and Clouds II, 715205 (December 5, 2008); doi:10.1117/12.804941.

[5] Nakajima, T. Y., **K. Suzuki**, and T. Nakajima, 2006: Cloud microphysical properties retrieved from MODIS sub-sampling radiance dataset over the extended GAME region, *Proc. SPIE*, **6408**, *Remote Sensing of the Atmosphere and Clouds,* 64080E (December 1, 2006); doi:10.1117/12.692683.

[4] **Suzuki, K.**, T. Nakajima, T. Y. Nakajima, H. Masunaga, T. Matsui, A. P. Khain, 2006: Characteristics of water cloud optical property as simulated by a non-hydrostatic spectral microphysics cloud model. *Proc. AMS 12th Conference on Cloud Physics and Atmospheric Radiation*, J2.8, 112753.

[3] **Suzuki, K**., T. Nakajima, A. Numaguti, T. Takemura, K. Kawamoto, and A. Higurashi, 2002: GCM-simulated and satellite-retrieved cloud-aerosol interaction. *Proc. AMS 11th Conference on Cloud Physics and Atmospheric Radiation*. P3.16.

[2] **Suzuki, K**., T. Nakajima, A. Numaguti, T. Takemura, K. Kawamoto, and A. Higurashi, 2001: Effect of aerosol on cloud field with satellite-derived data and GCM simulation, *Proc. SPIE*, **4150**, *Optical Remote Sensing of the Atmosphere and Clouds II,* 349 (February 21, 2001); doi:10.1117/12.416976.

[1] Takemura, T., H. Okamoto, A. Numaguti, **K. Suzuki**, A. Higurashi, and T. Nakajima, 2001: Global three-dimensional simulation and radiative forcing of various aerosol species with GCM, *Proc. SPIE*, **4150**, *Optical Remote Sensing of the Atmosphere and Clouds II,* 249 (February 21, 2001); doi:10.1117/12.416964.

Book Chapters

[1] **Suzuki, K**., 2008: Cloud microphysical modeling, *Meteorological Research Note* "Aerosol effect on climate and atmospheric environment" (Eds. T. Nakajima and T. Hayasaka), **218**, 123-138 (in Japanese).

Ph.D dissertation

Suzuki, K., 2004: A study on numerical modeling of cloud microphysics for calculating the particle growth process, Ph.D degree awarded by University of Tokyo, 136pp.

Selected Talks (Seminars/Conferences/Meetings):

Suzuki, K., 2014: Modeling of convection and composition: An overview of recent NICAM activities, *JPL Center for Climate Sciences Workshop on Atmospheric Composition and Convection*, Pasadena, CA, 26 August, 2014 (invited).

Suzuki, K., J.-C. Golaz, A. Bodas-Salcedo, T. Yokohata, M. Wang, T. Koshiro, G. Stephens, and T. Nakajima, 2014: Satellite-based evaluation of the warm cloud processes in global models and its implication for aerosol indirect forcing, *Asia-Oceania Geosciences Society 11th Annual Meeting (AOGS 2014)*, Sapporo, Japan, 1 August, 2014 (invited).

Suzuki, K., J.-C. Golaz, H. Guo, and G. L. Stephens, 2014: Evaluating cloud parameterizations in a climate model with satellite observations, *American Meteorological Society* (*AMS) Conference on Atmospheric Radiation and Cloud Physics*, Boston, MA, 10 July, 2014.

Suzuki, K., 2014: Cloud microphysics and climate, *Commemorative Talk for Society Award from the Meteorological Society of Japan (MSJ), MSJ Spring Meeting*, Yokohama, Japan, 21

May, 2014 (invited).

Suzuki, K., 2014: Clouds, Aerosols and Climate Predictions, *JPL Center for Climate Sciences Advisory Board Meeting*, *Jet Propulsion Laboratory*, Pasadena, CA, 4 March, 2014.

Suzuki, K., 2014: Evaluating cloud tuning in a climate model with satellite observations, *JPL Center for Climate Sciences Friday Talks*, *Jet Propulsion Laboratory*, Pasadena, CA, 28 February, 2014.

Suzuki, K., 2014: Evaluation of the warm cloud microphysical processes in global models using the CloudSat/A-Train multi-sensor satellite observations, *Geophysical Fluid Dynamics Laboratory*, Princeton, NJ, 20 February, 2014. (invited)

Suzuki, K., J.-C. Golaz, and G. L. Stephens, 2013: Evaluating cloud tuning in a climate model with satellite observations, *American Geophysical Union (AGU) Fall Meeting*, San Francisco, CA, 13 December, 2013.

Suzuki, K., 2013: Use of the CloudSat/A-Train satellite observations for evaluating the warm cloud microphysical processes in global models. *European Cooperation in Science and Technology (COST) Action ES0905 Working Group 4 Workshop*, Warsaw, Poland, 18-20 February, 2013. (invited)

Suzuki, K., 2012: Use of the CloudSat/A-Train satellite observations for model diagnosis of cloud microphysical processes. *1st Pan-Global Atmosphere System Study (GASS) Workshop*, Boulder, CO, 10-14 September, 2012. (invited)

Suzuki, K., 2012: Cloud microphysics and its interaction with aerosols: modeling and satellite observations, *Yuk Yung Lunch Seminar, California Institute of Technology*, Pasadena, CA, 14 February, 2012. (invited)

Suzuki, K., G. L. Stephens, T. Y. Nakajima, T. Nakajima, M. Satoh and S. van den Heever, 2011: Warm cloud microphysics and its interaction with aerosols: cloud-resolving modeling and satellite observation. *European Geosciences Union (EGU) General Assembly 2011*, Vienna, Austria, 6 April, 2011. (invited)

Suzuki, K., 2010: Warm cloud microphysics and its interaction with aerosols: Global cloud-resolving modeling and multisensor satellite observation, *Jet Propulsion Laboratory*, Pasadena, CA, 7 December, 2010. (invited)

Suzuki, K., 2010: Cloud microphysics and its interaction with aerosol: Numerical modeling and satellite observation, *Radiation, Clouds, Aerosols and Climate Workshop (in celebration of 60th birthday of Prof. Terry Nakajima)*, Sendai, Japan, 20-21 August, 2010.

Suzuki, K., G. L. Stephens, T. Y. Nakajima, and S. C. van den Heever, 2009: Multi-sensor analysis of A-Train observations for investigating the warm cloud microphysical processes. *American Meteorological Society Conference on Radar Meteorology*, Williamsburg, VA, 4-9 October, 2009.

Suzuki, K., 2009: A study of warm cloud microphysics using multi-sensor satellite observations and cloud-resolving models, *Center for Climate System Research, University of Tokyo*, Kashiwa, Japan, June 18, 2009.

Suzuki, K., 2008: A study of aerosol-cloud interaction using modeling and satellite observations, *University of Wyoming*, Laramie, WY, 20 May, 2008. (invited)

Suzuki, K., T. Nakajima, T. Y. Nakajima, H. Masunaga, T. Matsui, and A. P. Khain, 2006: Characteristics of water cloud optical properties as simulated by non-hydrostatic spectral microphysics cloud model, *American Meteorological Society Conference on Atmospheric Radiation and Cloud Physics*, Madison, WI, 10-15 July, 2006.

Suzuki, K., T. Nakajima, T. Y. Nakajima, and T. Iguchi, 2005: Numerical study of the aerosol effect on water cloud optical properties with non-hydrostatic spectral microphysics cloud model. *International Association of Meteorology and Atmospheric Science 9th Scientific Assembly*, Beijing, China, 2-11 August, 2005.

Suzuki, K., T. Nakajima, and T. Y. Nakajima, 2005: Characteristics of water cloud optical properties as simulated by non-hydrostatic spectral microphysics cloud model, *Cloud Modeling Workshop*, Fort Collins, CO, 6-8 July, 2005.

Suzuki, K., T. Nakajima, A. Numaguti, T. Takemura, K. Kawamoto, and A. Higurashi, 2001: GCM-simulated and satellite-retrieved cloud-aerosol interaction. *International Association of Meteorology and Atmospheric Science 8th Scientific Assembly*, Innsbruck, Austria, 10-18 July, 2001.

Session Chairs:

[1] Clouds, Aerosols and Radiation Session, *EGU General Assembly 2011*, 6 April, 2011.

Research Grants:

"Use of CloudSat and A-Train multi-sensor satellite observations to improve representation of aerosol effect on precipitation in climate models", **K. Suzuki** (PI), NASA ROSES, *CloudSat and CALIPSO Science Team Recompete*, NNH12ZDA001N-CCST, $450,000, 2013-2016.

"A study of aerosol-cloud interaction with numerical modeling of cloud microphysical processes", **K. Suzuki** (PI), *Research Grants for Young Scientists*, The Japan Prize Foundation, 1000,000JPY, 2006.

Journals Referee:
Nature
Geophysical Research Letters
Journal of Geophysical Research
Journal of the Atmospheric Sciences
Journal of Climate
Journal of Applied Meteorology and Climatology
Journal of Atmospheric and Oceanic Technology
Atmospheric Chemistry and Physics
Climate Dynamics
Atmospheric Research
Journal of the Meteorological Society of Japan
Asia-Pacific Journal of Atmospheric Sciences
British Journal of Environment and Climate Change

Grant Proposals Referee:
NASA ROSES online reviewer (2013)
NASA ROSES panelist reviewer (2014)

Outreach:

[1] Mentored a summer internship student, Brian Zambri from California State University of Northridge, on analysis of ship track clouds using MODIS satellite data, June-August 2012, JPL summer internship program.

[2] Gave an Earth Science talk to high school students visiting JPL from Daiichi Kannonji High School designated as Super Science High (SSH) school, November 2013, JPL.

[3] Answered questions by Japan NHK TV director for its program “Science Zero”, September 2014.