Kevin **McGouldrick**

Research Scientist, Ph.D.

3665 Discovery Dr., Boulder CO, USA (+1) 303 492 2951

kevin.mcgouldrick@lasp.colorado.edu

Kevin McGouldrick is a planetary atmospheric scientist whose career has focused on microphysical modelling and observations of the clouds of Venus. In particular, he has explored the interaction between planetary aerosols and their atmospheric radiative and dynamical environments, as well as inferring physical properties of planetary aerosols through microphysical modelling and radiative transfer analysis.

Education

Philosophiæ Doctor (Ph.D.), Astrophysical, Planetary, and Atmospheric Sciences, University of Colorado Boulder — 2007

Title: "Microphysics and Radiative-Dynamical Feedback in the Near Infrared Brightness Features in the Venus Clouds." Supervisor: Owen Brian Toon

Master of Science (M.S.), Astrophysical, Planetary, and Atmospheric Sciences, University of Colorado Boulder — 2002

Bachelor of Science (B.S.), Astronomy and Astrophysics, The Pennsylvania State University — 1999

Bachelor of Science (B.S.), Physics, The Pennsylvania State University — 1999

Work Experience

Assistant Director for Planetary Science, Laboratory for Atmospheric and Space Physics — 2023 Oct –

Supported at 0.30FTE to advocate for the planetary scientists to the administration of LASP, manage personnel issues, and organize employment logistics.

Research Scientist III, Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO — 2021–

A "soft money" position, comparable to Full Professor. Primary responsibility is a balanced workload including self-directed research, education through teaching and/or student mentorship, and service to the discipline and the Lab.

Research Scientist II, Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO — 2010–2021

A "soft money" position, comparable to Assistant Professor. Primary responsibility is sustaining an active and lively research program; secondary responsibilities are education and service, at levels approaching that expected of a Full Professor.

Planetary Atmospheres Postdoctoral Scholar, Planetary Science Division, Denver Museum of Nature & Science, Denver, CO — 2007–2010

Primary Responsibility was to complete research projects under the guidance of supervisor Dr. David Grinspoon; secondary responsibilities included content support for the Space Odyssey (Earth and Space Science) exhibits and events.

Funding Successes (PI-only)

NASA Solar System Workings (SSW) Program. PI: Kevin McGouldrick. *1.20fte/3yr* SSW2023

"Clouds in the Upper Atmosphere of Venus Induced by Small Body Encounters."

NASA Solar System Workings (SSW) Program. PI: Kevin McGouldrick. *1.20fte/3yr* SSW2022

"The Gumdrop Hypothesis, Revisited."

NASA Planetary Data Archiving, Restoration, and Tools (PDART) Program. PI: Kevin McGouldrick. *1.00fte/3yr* PDART2021

"Completing the Archiving of the Pioneer Venus Orbiter UV Spectrometer Data Set."

NASA Akatsuki Participating Scientist Program. PI: Kevin McGouldrick. *1.00fte/3yr* VCOPSP2019

"Complementing the Akatsuki mission goals to characterize Venusian clouds and dynamics through microphysical simulations and other spacecraft observations."

NASA Solar System Workings (SSW) Program. PI: Kevin McGouldrick. *1.00fte/3yr* SSW2015

"Groundwork for a Coupled Microphysics and Dynamical Model of the Venus Cloud System."

NASA Planetary Mission Data Analysis (PMDAP) Program. PI: Kevin McGouldrick. *1.00fte/3yr* PMDAP2013

"Meteorology of the middle and lower cloud decks of Venus Using VIRTIS/Venus Express."

NASA Planetary Atmospheres Program. PI: Kevin McGouldrick. *0.75fte/3yr* PATM2011

"A Comprehensive Model of the Venus Cloud System."

NASA VCO Participating Scientist Program. PI: Kevin McGouldrick. *2.83 fte/4yr* VCOPSP2009

"Combined Theoretical and Observational Multi-Disciplinary Analysis of the Structure and Evolution of the Clouds and Hazes of Venus." ***Funding for the program was withdrawn by NASA after JAXA's Venus Climate Orbiter (Akatsuki) failed to achieve orbit insertion in December, 2010. But was restored upon successful second attempt at orbit insertion in December, 2015.***

Teaching Experience: Instructor of Record

Instructor, Astrophysical and Planetary Sciences, University of Colorado Boulder Spring 2021

ASTR 5835: Seminar in Planetary Science. *1 credit-hour; 4 such credit hours are a part of the requirements for the graduate degree.* Topical Seminar for Graduate Students. This semester, the topic was " Venus Past Discoveries & Future Missions." I served as a co-instructor in this course with Dr. Nick Schneider and Dr. Larry Esposito.

Instructor, Astrophysical and Planetary Sciences, University of Colorado Boulder Autumn 2015

ASTR 5835: Seminar in Planetary Science. *1 credit-hour; 4 such credit hours are a part of the requirements for the graduate degree.* Topical Seminar for Graduate Students. This semester, the topic was "Venus: Looking Forward from Venus Express." This course was co-taught between myself and Dr. Larry Esposito.

Instructor, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2014

ASTR 1030: Accelerated Introductory Astronomy I: Solar System. *3 credit-hours (plus a required lab).* The first part of a two-part survey course for STEM majors covering topics of planetary science (the second part covers topics of Astronomy and Astrophysics beyond the Solar System). A required course for ASTR majors, an optional elective for several other STEM majors.

Instructor, Astrophysical and Planetary Sciences, University of Colorado Boulder — Spring 2014

ASTR 1000: Introductory Astronomy – The Solar System. *3 credit-hours.* A survey course for non-majors covering topics of planetary science with a primary emphasis on developing critical thinking techniques and a secondary emphasis on developing mathematics skills (and comfort level).

Part-Time Instructor, Front Range Community College, Westminster, CO — Spring 2013

PHY105: Conceptual Physics with Lab *4 credit-hours.* A broad survey course covering the majority of topics in the field of Physics, with a primary focus on breadth of coverage, and a secondary focus on hands-on experience through lab activities.

Teaching Experience: Temp/Substitute/Subordinate

Instructor, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2022

ASTR 5835: Seminar in Planetary Science. *1 credit-hour; 4 such credit hours are a part of the requirements for the graduate degree.* Topical Seminar for Graduate Students. This semester, the topic was "'Origins, Worlds & Life.' A Decadal Strategy for Planetary Science & Astrobiology 2023-2032." This course is formulated as a means to invite the students to anticipate research opportunities suggested by the findings of the Planetary Decadal Survey. I served as a supporting instructor in this course led by Dr. Larry Esposito.

Instructor, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2020

ASTR 5835: Seminar in Planetary Science. *1 credit-hour; 4 such credit hours are a part of the requirements for the graduate degree.* Topical Seminar for Graduate Students. This semester, the topic was "The Planetary Decadal Survey." I served as a supporting instructor in this course led by Dr. David Brain.

Substitute Lecturer, Astrophysical and Planetary Sciences, University of Colorado Boulder — Spring 2019

ASTR 3720: Planetary Atmospheres. *Instructor of Record: Dr. Nicholas Schneider.* Prepared and delivered a lecture on greenhouse effect and atmospheric loss assessment and mechanisms for a Junior/Senior level class when regular instructor was away at a conference.

Substitute Lecturer, Astrophysical and Planetary Sciences, University of Colorado Boulder — Spring 2016

ASTR 3720: Planetary Atmospheres. *Instructor of Record: Dr. Nicholas Schneider.* Prepared and delivered two lectures on Radiative Transfer and Atmospheric Structure (with focus on Venus, of course ;-)) for a Junior/Senior level class when regular instructor was away at a conference.

Substitute Lecturer, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2011

ASTR 3750: Planets, Moons, and Rings. *Instructor of Record: Dr. Larry Esposito.* Prepared and delivered a lecture on Venus atmosphere for a Junior/Senior level class when regular instructor was away at a conference.

Substitute Lecturer, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2010

ASTR 3750: Planets, Moons, and Rings. *Instructor of Record: Dr. Larry Esposito.* Prepared and delivered a series of three lectures on Mercury and Venus for a Junior/Senior level class when regular instructor was away at a conference.

Lab and Lecture TA, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2003

ASTR 1030: Accelerated Introductory Astronomy I: Solar System *Instructor of Record: Dr. Ted Snow.* Instructor for once-weekly meetings of a section of accelerated Intro Astronomy (for majors); also prepared a lecture on Venus, the greenhouse effect, and loss of water.

Lab and Lecture TA, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 2002

ASTR 1030: Accelerated Introductory Astronomy I: Solar System *Instructor of Record: Dr. Bob Ergun.* Instructor for once-weekly meetings of a section of accelerated Intro Astronomy (for majors).

Lecture TA, Astrophysical and Planetary Sciences, University of Colorado Boulder — Spring 2000

ASTR 1120: Introductory Astronomy II: Stars and Galaxies *Instructor of Record: Dr. Brad Gibson.* Grading of weekly homework and monthly exams. Also prepared two lectures on Stellar Evolution when Instructor was out of town.

Lab TA, Astrophysical and Planetary Sciences, University of Colorado Boulder — Autumn 1999

ASTR 1010: Introductory Astronomy I: Solar System *Instructor of Record: Dr. Ted Snow.* Instructor for once-weekly meetings of two laboratory sections of Intro Astronomy.

Grading Assistant, Astronomy and Astrophysics, The Pennsylvania State University — Spring 1996

ASTRO 1: Introductory Astronomy *Instructor of Record: Dr. Eric Feigelson.* Graded weekly quizzes and monthly examinations.

Student Mentoring

Grace Fassio, NSF Research Experience for Undergraduates. University of Colorado Boulder. — Summer 2023

Primary advisor for a project to examine possible effects of the Faint Young Sun problem on the early evolution of the Venus atmosphere and clouds. This project involved performing simulations using the PlanetCARMA model and analyzing results using Python. Ms. Fassio presented her research at the 2023 Fall AGU Meeting. Co-mentor: Dr. Erika Barth, SwRI.

Andrew Buggee, Ph. D. student at University of Colorado Boulder, Department of Atmospheric and Oceanic Sciences. Primary Advisor: Dr. Peter Pilewskie. 2021–

I have served as a member of Mr. Buggee's Ph. D. Annual Progress Review committee, and Comps II (Ph. D. qualifying exam).

Ryan McCabe, Ph. D. student at Hampton University. Primary Advisor: Dr. Kunio Sayanagi, Hampton University. 2016–2023

I serve as Science advisor for this project focused on characterizing the atmospheric dynamics of Venus using data from a variety of ground based and space based platforms. Dr. McCabe earned his Ph. D. in May, 2023.

Eric Petersen, NSF Research Experience for Undergraduates. University of Colorado Boulder. Summer 2011

Primary advisor for a project to analyze the evolution of individual cloud features in the atmosphere of Venus seen in $1.74 \mu m$ images taken with the VIRTIS instrument on Venus Express.

Observational Experience

Apache Point Astrophysical Research Consortium 3.5m 2023 Sep

Observed Venus with the TripleSpec high resolution imaging spectrometer to obtain primarily H and K band spectra of the night side of Venus; coordinated with contemporaneous IRTF observations, to extend time baseline and provide higher spectral resolution of airglow features.

NASA Infrared Telescope Facility 2023 July

Participated in a 20-day observation campaign led by Eliot Young of SwRI at NASA's IRTF to obtain H-band, K-band, and (approximately) M-band spectra and time series imagery of cloud motions in the Venus atmosphere.

Apache Point Astrophysical Research Consortium 3.5m 2022 Feb

Observed Venus with the TripleSpec high resolution imaging spectrometer to obtain primarily H and K band spectra of the night side of Venus; coordinated with contemporaneous IRTF observations, to extend time baseline and provide higher spectral resolution of airglow features.

NASA Infrared Telescope Facility 2022 Feb

Participated in a 20-day observation campaign led by Eliot Young of SwRI at NASA's IRTF to obtain H-band, K-band, and (approximately) M-band spectra and time series imagery of cloud motions in the Venus atmosphere.

Apache Point Astrophysical Research Consortium 3.5m 2021 Dec

Observed Venus with the ARC Echelle Spectrometer to obtain primarily Visible wavelength spectra of the night side of Venus in the aftermath of the planet's encounter with the tail of Comet C/2021 A1 (Leonard).

NASA Infrared Telescope Facility 2021 Dec

Participated in a 20-day observation campaign led by Eliot Young of SwRI at NASA's IRTF to obtain H-band, K-band, and (approximately) M-band spectra and time series imagery of cloud motions in the Venus atmosphere.

NASA Infrared Telescope Facility 2020 Jun-Jul

Participated in 20-day observation campaign (in two segments) led by Eliot Young of SwRI at NASA's IRTF to obtain H-band, K-band, and (approximately) M-band spectra and time series imagery of cloud motions in the Venus atmosphere.

NASA Infrared Telescope Facility 2018 Nov-Dec

Participated in 20-day observation campaign led by Eliot Young of SwRI at NASA's IRTF to obtain H-band and K-band spectra and time series imagery of cloud motions in the Venus atmosphere.

NASA Infrared Telescope Facility 2017 Apr-May

Participated in 20-day observing run led by Eliot Young of Southwest Research Institute at NASA's Infrared Telescope Facility (IRTF); goal was to obtain spectra and images of Venus at H-band and K-band.

Apache Point Astrophysical Research Consortium 3.5m 2017 Apr

Observed Venus in grism mode with the Near Infrared Camera / Fabry-Perot Spectrometer (NICFPS) to obtain H-band spectral cubes.

Apache Point Astrophysical Research Consortium 3.5m 2016 Dec – 2017 Jun

Numerous remote observations with APO ARC 3.5m, using ARCTIC (ARC Telescope Imaging Camera).

Apache Point Astrophysical Research Consortium 3.5m 2016 Nov

Trained on Apache Point Observatory 3.5m Astrophysical Research Consortium telescope. Observed Venus using NICFPS (Near Infrared Camera & Fabry-Perot Spectrometer).

Public Outreach (EPO and Science Communication)

High School Outreach, Amerikanska Gymnasiet, Sweden 2024 Oct 3

Through one virtual interview, served as a subject matter expert for a planetary science focused investigative project about Venus by a high school student at Amerikanska Gymnasiet, Sweden.

Middle School Outreach, Berwick Academy, South Berwick, ME 2023-2024

Through weekly virtual meetings, serving as a Subject Matter expert and Mentor for an "Innovation Project" by a 5th grade student at Berwick Academy to explore whether Pluto should be considered a planet.

Citizen Science, Denver Museum of Nature & Science, Denver, CO 2008-2017

Part of a three-member team at the Denver Museum of Nature & Science leading a "citizen-scientists" research effort to analyze more than 100,000 near-infrared images of the planet Venus obtained by NASA's Infrared Telescope Facility over a ten-year (and growing) span of time.

Middle School and International Outreach, Tokyo, Japan 2017 Oct 29

Interactive Presentation for middle school students at "Science Club" at Tokyo National Museum of Nature and Science on the topic of Venus Atmospheric Science and the science of Akatsuki.

Adult Outreach, Denver Museum of Nature & Science, Denver, CO 2017 Jun 28

Summary of early Akatsuki Science Results: "60 Minutes in Space" at Denver Museum of Nature & Science.

Adult and International Outreach, Shimokitazawa, Tokyo, Japan 2017 Apr 18

"Space Cafe" talk at Good Heavens Pub on the Akatsuki mission and relevance to exoplanetary studies.

Popular Science Publication 2017 Jan 19
Authored article, "Akatsuki Returns from the Dead," published by ***Boulder Weekly***

Middle School and International Outreach, Tokyo, Japan 2016 Oct 01
Interactive Presentation for middle school and junior high school students at "Science Club" at Tokyo National Museum of Nature and Science on the topic of Venus Atmospheric Science and my experience as Participating Scientist in Residence In Japan.

Adult and International Outreach, Japan Aerospace Exploration Agency 2016 Jul 30-31
Facilitated ISAS/JAXA "Open Campus," explaining Akatsuki mission goals and results.

Adult Outreach, Denver Museum of Nature & Science 2016 Apr 27
Summary of Akatsuki Science and the difficulty in its arrival at Venus: "60 Minutes in Space" at Denver Museum of Nature & Science.

Adult Outreach, Niwot, CO 2016 Mar 15
"Tuesday Nerd Talk" at Powder Keg Brewery, Niwot, CO, on the history of international collaboration in Venus research.

Citizen Science Outreach, Boulder Astronomy and Space Society, Boulder, CO 2014 May 17
Guest lecture and discussion on Venus observations and Science with the Boulder Astronomy and Space Society.

Adult and Young Adult Outreach, Denver Museum of Nature & Science, Denver, CO 2013 May 16
Participation as a local "expert" on the planet Venus at a "Science Lounge" outreach event at the Denver Museum of Nature & Science.

Adult Education Outreach,Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO 2012 Jun 19
Presentation on how to incorporate observations of Venus into Trigonometry lessons for teachers' workshop held at LASP.

Astronomical Event Outreach, Sommers-Bausch Observatory, University of Colorado Boulder, Boulder, CO 2012 Jun 05
Facilitated Transit of Venus observation activities through monitoring operation of telescopes and solar projection devices, and science discussions.

Adult Outreach, Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO 2012 April 04
LASP Public Lecture on Transits and Observations of Venus

Junior High Outreach, Laboratory for Atmospheric and Space Physics, University of Colorado Boulder, Boulder, CO 2011 Oct 18
30-minute presentation about Venus for visiting Junior High students

Astronomical Event Outreach, Sommers-Bausch Observatory, University of Colorado Boulder, Boulder, CO 2011 Apr 23

Facilitated Astronomy Day activities.

Adult Outreach, Denver Museum of Nature & Science, Denver, CO 2010 Nov 03
Curators' Lunchtime Lecture

Adult Outreach, Denver Museum of Nature & Science, Denver, CO 2009 Jul 08
Curators' Lunchtime Lecture

Middle School Outreach, Denver Museum of Nature & Science, Denver, CO 2009 Feb
Volunteer Judge at Denver Metro Regional Science Fair

Adult Outreach, Denver Museum of Nature & Science, Denver, CO 2008 Sep 24
Curators' Lunchtime Lecture

Middle School Outreach, Denver Museum of Nature & Science, Denver, CO 2008 Feb
Volunteer Judge at Denver Metro Regional Science Fair

Middle School Outreach 2002 Feb 22
Volunteer Judge at High Peaks Elementary Science Fair

Astronomical Event Outreach, Sommers-Bausch Observatory, University of Colorado Boulder, Boulder, CO 1999–2007
Hosted multiple Open House Observing Nights and Astronomy Day festivities while a graduate student.

Astronomical Event Outreach, The Pennsylvania State University, University Park, PA 1994–1999
Hosted multiple Open House Observing Nights while an undergraduate student and a member of the Penn State Astronomy Club.

Professional Service Activities

Member of PDS Atmospheres Node Advisory Group. 2020–present

Co-convener of Venus Science sessions (3) at Japan Geosciences Union Meeting (hybrid) 2024 May
With Co-conveners Takehiko Satoh, Moa Persson, and George Hashimoto.

Planetary Science Group Assistant Director to the LASP Associate Director for Science 2023 Oct – present
Supported at 0.30FTE to advocate for the planetary scientists to the administration of LASP, to manage personnel issues, and to organize employment logistics.

Co-convener of Venus Science sessions (3) at Japan Geosciences Union Meeting (hybrid) 2023 May
With Co-conveners Takehiko Satoh, Moa Persson, and George Hashimoto.

Planetary Representative of LASP Seminar Committee 2021 Jul – 2023 Dec
With fellow committee members, solicit and support speakers for the weekly LASP Seminar (*i.e.*, Colloquium).

Co-convener of Venus Science sessions (3) at Japan Geosciences Union Meeting (hybrid) 2021 May

With Co-conveners Takehiko Satoh, Hideo Sagawa, and Thomas Widemann.

Co-convener of "Science of Venus: Venus Express, Akatsuki, and beyond" sessions (3) at Japan Geosciences Union Meeting (virtual) 2020 July

With Co-conveners Takehiko Satoh, Hideo Sagawa, and Thomas Widemann.

NASA Participating Scientist in Residence with *Akatsuki* 2016–2019

Facilitate cross-oceanic communication between JAXA Akatsuki Team and NASA Participating scientists; local support for remote participants in Akatsuki Science Team Meetings, held at ISAS, JAXA, Sagamihara, Japan, etc.

VEXAG At-Large Steering Committee Member 2017 Feb – 2020 Jun

Member of VEXAG Goals, Objectives, and Investigations (GOI) document committee. 2019

Member of VEXAG Roadmap document committee. 2019

Local Host of 2019 VEXAG meeting (held 6-8 November 2019 at Laboratory for Atmospheric and Space Physics, Boulder, CO Nov 2019

Local Co-organizer (with Dr. Emilie Royer), part of Organizing Committee (with Dr. Darby Dyar and Dr. Noam Izenberg).

Member of the Scientific Organizing Committee for the International Venus Conference 2017 Apr - 2019 Jun

Originally planned to be held in Niseko, Hokkaido, Japan in September 2018 (***postponed by major earthquake in Sapporo, Hokkaido until May, 2019***)

Co-convener of "Recent advances of Venus science" sessions (3) at Japan Geosciences Union Meeting 2019 May

With Co-conveners Takehiko Satoh, Takeshi Horinouchi, and Masaru Yamamoto.

Co-convener of "Results from Akatsuki and advances in Venus science" sessions (3) at Japan Geosciences Union Meeting 2018 May

With Co-conveners Takehiko Satoh, Takeshi Horinouchi, and Masaru Yamamoto.

Member of Venus Aerial Platforms Study Team. 2017 May - 2018 Feb

Resulted in publication of findings, "Aerial Platforms for the Scientific Exploration of Venus" by Cutts et al.

Guest Editor for a Special Issue of *Earth, Planets, Space* about the initial *Akatsuki* mission results. 2017 May-Nov

Co-convener of "Results of Venus science with Akatsuki in orbit for 1.5 year" sessions (3) at Japan Geosciences Union Meeting 2017 May

With Co-conveners Takehiko Satoh, Takeshi Horinouchi, and Masaru Yamamoto.

Lead of Revision to VEXAG GOI document 2016 Jan-Jul

Led a small team tasked with ensuring that space physics topics were adequately addressed in a revision of the VEXAG GOI document.

Participant and sub-panel assistant chair in Venus Technology and Laboratory Needs Workshop. 2015 Apr

Participant and sub-panel chair in Venus Exploration Targets Workshop. 2014 May

Member of VEXAG Goals, Objectives, and Investigations document committee. 2013 May - 2014 Sep

Co-convener of "Using Numerical Models to Understand the Venus Atmosphere and Surface" session at American Geophysical Union Fall Meeting 2012 Dec

With Co-conveners Chris Lee and Constantine Tsang.

Proposal Reviews 2008 –

Served on numerous (nine as panelist, over a dozen as external reviewer) NASA R&A and Mission Concept Study Reviews in various roles, including external reviewer, panelist, Group Chief, and Panel Lead.

Research Article Reviews 2011 –

Peer Reviewer of 26 original research articles that had been submitted to *Geophysical Research Letters*, *Nature Astronomy*, *Advances in Space Research*, *Icarus*, *Journal of Geophysical Research: Planets*, *Planetary and Space Science*, *Arabian Journal of Chemistry*, *Astrophysical Journal*, *Astrophysical Journal Letters*, *Planetary Science Journal*, and *Astronomy and Computing*; and of a review article on planetary atmospheres for a conference proceedings.

Dataset Reviews 2024 –

Participated in the review of the "Pioneer Venus Multiprobe and Orbiter data known as the Special Events Data" dataset.

Professional Memberships

American Association for Aerosol Research	2024 Sep –
Japan Geosciences Union	2016 Oct –
American Geophysical Union	2012 Aug –
AAS: Division for Planetary Sciences	2000 Oct –
American Astronomical Society	1999 Jan –
ΦBK: Lambda of Pennsylvania	1999 May –

Languages

Mothertongue: **English**
Familiar, but not fluent: **Latin, Italian, Spanish, Japanese**

Publications

First-Author Peer-reviewed Articles

[1] **K. McGouldrick**, E. L. Barth. (2023). The Influence of Cloud Condensation Nucleus Coagulation on the Venus Cloud Structure. *Planet. Sci. J.* 4.3 (2023) p. 50. 2023. DOI: 10.3847/PSJ/acbdf8

[2] **K. McGouldrick**, J. Peralta, J. K. Barstow, C. C. C. Tsang. (2021). Using VIRTIS on Venus Express to Constrain the Properties of the Enormous Dark Cloud observed in images of Venus by IR2 on Akatsuki. *Planet. Sci. J.* 2.4 (2021) p. 153. 2021. DOI: 10.3847/PSJ/ac0e39

[3] **K. McGouldrick**. (2017). Effects of variation in coagulation and photochemistry parameters on the particle size distributions in the Venus clouds. *Earth Planets Space* 69.1 (2017) p. 161. 2017. DOI: 10.1186/s40623-017-0744-x

[4] **K. McGouldrick**, C. C. C. Tsang. (2017). Discovery of a 150 day period in the Venus Condensational Clouds. *Icarus* 286 (2017) pp. 118–133. 2017. DOI: 10.1016/j.icarus.2016.10.005

[5] **K. McGouldrick**, T. W. Momary, K. H. Baines, D. H. Grinspoon. (2012). Quantification of middle and lower cloud variability and mesoscale dynamics from Venus Express / VIRTIS observations at 1.74μm. *Icarus* 217.2 (2012) pp. 615–628. 2012. DOI: 10.1016/j.icarus.2011.07.009

[6] **K. McGouldrick**, O. B. Toon, D. H. Grinspoon. (2011). Sulfuric acid aerosols in the atmospheres of the terrestrial planets. *Planet. Space Sci.* 59.10 (2011) pp. 934–941. 2011. DOI: 10.1016/j.pss.2010.05.020

[7] **K. McGouldrick**, K. H. Baines, T. W. Momary, D. H. Grinspoon. (2008). Venus Express / VIRTIS observations of middle and lower cloud variability and implications for dynamics. *J. Geophys. Res.* 113 (2008) E00B14. 2008. DOI: 10.1029/2008JE003113

[8] **K. McGouldrick**, O. B. Toon. (2008). Observable effects of convection and gravity waves on the Venus condensational cloud. *Planet. Space Sci.* 46 (2008) pp. 1112–1131. 2008. DOI: 10.1016/j.pss.2008.02.010

[9] **K. McGouldrick**, O. B. Toon. (2008). Modeling the effects of shear on the evolution of the holes in the condensational clouds of Venus. *Icarus* 196 (2008) pp. 35–48. 2008. DOI: 10.1016/j.icarus.2008.02.020

[10] **K. McGouldrick**, O. B. Toon. (2007). Investigation of possible causes of the holes in the condensational Venus cloud using a microphysical cloud model with a radiative-dynamical feedback. *Icarus* 191 (2007) pp. 1–24. 2007. DOI: 10.1016/j.icarus.2007.04.007

All Peer-reviewed Articles

[1] J. M. Battalio, M. J. Cohen, P. L. Read, J. M. Lora, T. H. McConnochie, **K. McGouldrick**. 'Oscillations in Terrestrial Planetary Atmospheres'. In: ***Atmospheric Oscillations: Sources of Subseasonal-to-Seasonal Variability and Predictability***. Ed. by Bin Guan. Cambridge, MA, USA: Elsevier, 2024. Chap. 19.

[2] **K. McGouldrick**, E. L. Barth. (2023). The Influence of Cloud Condensation Nucleus Coagulation on the Venus Cloud Structure. *Planet. Sci. J.* 4.3 (2023) p. 50. 2023. DOI: 10.3847/PSJ/acbdf8

[3] **K. McGouldrick**, J. Peralta, J. K. Barstow, C. C. C. Tsang. (2021). Using VIRTIS on Venus Express to Constrain the Properties of the Enormous Dark Cloud observed in images of Venus by IR2 on Akatsuki. *Planet. Sci. J.* 2.4 (2021) p. 153. 2021. DOI: 10.3847/PSJ/ac0e39

[4] J. Peralta, T. Navarro, C. W. Vun, A. Sánchez-Lavega, **K. McGouldrick**, T. Horinouchi, T. Imamura, R. Hueso, J. P. Boyd, G. Schubert, T. Kouyama, T. Satoh, N. Iwagami, E. F. Young, M. A. Bullock, P. Machado, Y. J. Lee, S. S. Limaye, M. Nakamura, S. Tellmann, A. Wesley, P. Miles. (2020). A Long-

Lived Sharp Disruption on the Lower Clouds of Venus. *Geophys. Res. Lett.* 47.11, e87221 (June 2020) e87221. 2020. DOI: 10.1029/2020GL087221

[5] J. Peralta, 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. (2019). New cloud morphologies discovered on the Venus's night during Akatsuki. *Icarus* 333 (2019) pp. 177–182. 2019. DOI: 10.1016/j.icarus.2019.05.026

[6] J. Peralta, R. Hueso, T. Horinouchi, A. Sánchez-Lavega, S.-Y. Murakami, P. Machado, E. F. Young, Y. J. Lee, T. Kouyama, H. Sagawa, **K. McGouldrick**, T. Satoh, T. Imamura, S. S. Limaye, T. M. Sato, K. Ogohara, M. Nakamura, D. Luz. (2018). Nightside winds at the lower clouds of Venus with Akatsuki/IR2: Longitudinal, local, time, and decadal variations from comparison with previous measurements. *Astrophys. J. Suppl.* 239.2 (2018) p. 29. 2018. DOI: 10.3847/1538-4365/aae844

[7] D. Titov, N. I. Ignatiev, **K. McGouldrick**, V. Wilquet, C. F. Wilson. (2018). Venus III: Clouds and hazes of Venus. *Space Sci. Rev.* 214 (2018) p. 126. 2018. DOI: 10.1007/s11214-018-0552-z

[8] M. Nakamura, D. Titov, **K. McGouldrick**, P. Drossart, J.-L. Bertaux, H. Liu. (2018). Akatsuki at Venus: The first year of scientific operation. *Earth Planets Space* 70 (2018) p. 144. 2018. DOI: 10.1186/s40623-018-0916-3

[9] **K. McGouldrick**. (2017). Effects of variation in coagulation and photochemistry parameters on the particle size distributions in the Venus clouds. *Earth Planets Space* 69.1 (2017) p. 161. 2017. DOI: 10.1186/s40623-017-0744-x

[10] T. Horinouchi, 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. (2017). Equatorial jet in the lower to middle cloud layer of Venus revealed by Akatsuki. *Nat. Geosci.* 10 (2017) pp. 646–651. 2017. DOI: 10.1038/ngeo3016

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Commentary and White papers (not peer-reviewed)

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Invited Talks and Colloquia

Constraining Aerosol Composition via Microphysical Modelling 2023 Aug 2
CalTech/JPL Building Bridges Between Earth and Planetary Aerosols and Clouds

Venus Microphysics and Clouds **LPI** Venus Science Initiative: Surface and Atmosphere — 2023 Jan 31

Venus Aerosols and Dynamics **CalTech/JPL** Venus Aerosol Seminar Series — 2021 Aug 9

Ad Aspera Per Venerem (To the Stars, through Venus) **University of Colorado Boulder** Laboratory for Atmospheric and Space Physics Colloquium — 2021 Jan 28

Venus Atmospheric Dynamics from the Surface to Orbit. **Venus Exploration Analysis Group**, Invited Tutorial Talk — 2019 Nov 6

Aerosol Cloud Microphysics in the Solar System. **Rikkyo University, Tokyo, Japan**, Planetary Atmospheres Group Seminar — 2018 Oct 30

Microphysical Modelling of the Venus Clouds, Including Radiative Transfer. **Venera-D Modelling Workshop** Space Research Institute (IKI), Moscow, Russia. — 2017 Oct 05

Akatsuki Rises from the Dead to Explore the Depths of Hell. **University of Colorado Boulder** Laboratory for Atmospheric and Space Physics Colloquium — 2017 Sep 07

Effect of Coagulation on Particle Sizes in the Venus Clouds. **Institute for Space and Astronautical Science, Japan Aerospace Exploration Agency, Sagamihara, Japan** Planetary Atmospheres Group Seminar — 2016 Oct 07

The Clouds of Venus in a Global Context. **University of North Dakota, Grand Forks, ND** Department of Space Studies Colloquium — 2015 Mar 23

The Variable Visage of Venus: Understanding the Clouds of Venus through Simulations and Multi-wavelength Observations. **New Mexico State University, Las Cruces, NM** Department of Astronomy Colloquium — 2014 Mar 01

First Results of an Investigation of Sulfur Dioxide in the Ultraviolet from Pioneer Venus through Venus Express. **University of Colorado Boulder** Laboratory for Atmospheric and Space Physics Colloquium — 2012 Feb 16

Quantifying the Evolution of the Venus Clouds. **Southwest Research Institute, Boulder, CO** Department of Space Studies Colloquium — 2010 Nov 30

Comparing Apples and Oranges: Coming to Know Earth by Way of Venus. **Ball Aerospace, Boulder, CO** Colloquium — 2008 Oct 24

Conference Abstracts (only first-author and student first-author)

[1] K. McGouldrick. (2024). Four Decades of Ultraviolet Venus. *56th Meeting of the DPS, Boise, ID* 56, 110.01 (2024) p. 110.01. 2024

[2] K. McGouldrick, E. L. Barth. (2024). Toward a Mesoscale Dynamics and Microphysical Cloud Model of Venus.. *Japan Geoscience Union Meeting (Hybrid), Makuhari Messe, Chiba, Japan* PPS04 (2024) p. 15. 2024

[3] K. McGouldrick, K. Simmons, L. Esposito, C. Pankratz. (2023). Progress Toward Completing the Pioneer Venus Orbiter Ultraviolet Spectrometer Data Archive.. *American Geophysical Union, Fall Meeting, San Francisco, CA* P31E, 3135 (2023) p. 3135. 2023

[4] Grace Fassio, Kevin McGouldrick, Erika L. Barth. (2023). Modeling the Effect of a Faint Young Sun on Venus' Cloud Structure. *American Geophysical Union, Fall Meeting, San Francisco, CA* P13C, 2805 (2023) p. 2805. 2023

[5] K. McGouldrick, E. L. Barth. (2023). Exploring Jupiter's hazes with JIRAM.. *55th Meeting of the DPS, San Antonio, TX* 55, 325.02 (2023) p. 325.02. 2023

[6] K. McGouldrick, E. L. Barth. (2023). Long term variations in a simulated Venus cloud driven by changes in microphysical properties of the aerosols.. *Japan Geoscience Union Meeting (Hybrid), Makuhari Messe, Chiba, Japan* PPS04 (2023) P07. 2023

[7] K. McGouldrick, E. L. Barth. (2022). Long timescale variations of the Venus photochemical cloud driven by microphysics.. *54th Meeting of the DPS, London, Ontario, Canada* 54, 204.04 (2022) p. 204.04. 2022

[8] K. McGouldrick. (2021). Microphysics Implications of the Venus Bow Wave seen by LIR on Akatsuki.. *Japan Geoscience Union Meeting (Virtual)* PPS02 (2021) P07. 2021

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[10] K. McGouldrick, J. Peralta, J. Barstow, C. Tsang. (2020). Toward understanding the nature of the 'Disruption' and 'Enormous Cloud' seen by Akatsuki in the Venus atmosphere.. *52nd Meeting of the DPS (Virtual)* 52 (2020) #505.01. 2020

[11] K. McGouldrick. (2020). Effect of Insoluble Sulfur on the Microphysics of the Sulfuric Acid Clouds of Venus.. *Japan Geoscience Union Meeting (Virtual)* PPS06 (2020) P16. 2020

[12] K. McGouldrick, J. Peralta, J. Barstow, C. Tsang, T. Satoh. (2019). Understanding the Clouds of Venus through models and observations (Finding Earth in the Clouds of Venus).. *European Planetary Science Congress* Genevé, Switzerland (2019) #L2.79.1205. 2019

[13] K. McGouldrick, J. Peralta, T. Satoh. (2019). Cytherometeorology.. *2019 International Venus Conference* Niseko, Hokkaido, Japan (2019) D3-AM1–1. 2019

[14] K. McGouldrick, J. Peralta, T. Satoh. (2019). Mesoscale dynamics in the Venus atmosphere: The weather on Venus.. *Japan Geoscience Union Meeting, Chiba, Japan* PPS05 (2019) P09. 2019

[15] K. McGouldrick, J. Peralta, C. Tsang, J. Barstow, T. Satoh. (2018). Capricious Cytherian Clouds: How VIRTIS can help us understand the lessons taught by Akatsuki.. *2018 VEXAG Meeting* Laurel, MD (2018) p. 8055. 2018

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[21] K. McGouldrick. (2016). Microphysical modelling investigation of coalescence efficiency and photochemical production rates on particle size distributions in the Venus cloud system.. *American Geophysical Union, Fall Meeting* P53B (2016) p. 2191. 2016

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