Curriculum Vitæ of Dr. Kevin McGouldrick

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Education

Ph.D., Astrophysical, Planetary, and Atmospheric Sciences (2007),
Microphysics and Radiative-Dynamical Feedback in the Near Infrared Brightness Features in the Venus Clouds.
Thesis Supervisor: Dr. Owen B. Toon.
University of Colorado Boulder.

Work Experience

02/2010–present	Research Associate (LASP/University of Colorado)
08/2007-02/2010	Planetary Atmospheres Post-doctoral Researcher (Denver Museum of Nature & Science)

Refereed Publications

C. C. C. Tsang and **K. McGouldrick**. General circulation of Venus from a long-term synoptic study of tropospheric CO by Venus Express / VIRTIS. *Icarus*, 289:173–180, 2017.

J. Peralta, Y. J. Lee, **K. McGouldrick**, H. Sagawa, A. Sánchez-Lavega, T. Imamura, T. Widemann, and M. Nakamura. Overview of useful spectral regions for Venus: An update to encourage observations complementary to the Akatsuki mission. *Icarus*, 288:235–239, 2017.

K. McGouldrick and C. C. C. Tsang. Discovery of a 150 day period in the Venus condensational clouds. *Icarus*, 286:118–133, 2017.

K. McGouldrick. Quantifying the effects of coalescence properties on the clouds of Venus. 2017. *Submitted to Earth, Planets, Space.*

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, and E. F. Young. Equatorial jet in the lower to middle cloud layer of Venus revealed by Akatsuki. *Nat. Geosci.*, 10:646–651, 2017.

K. McGouldrick and L. W. Esposito. A re-analysis of SO_2 in the upper atmosphere of Venus from Pioneer Venus Orbiter UV Spectrometer. 2016. *In Preparation.*

K. Molaverdikhani, **K. McGouldrick**, and L. W. Esposito. The abundance and vertical distribution of the unknown ultraviolet absorber in the Venusian atmosphere from analysis of Venus Monitoring Camera images. *Icarus*, 217(2):648–660, 2012.

K. McGouldrick, T. W. Momary, K. H. Baines, and D. H. Grinspoon. Quantification of middle and lower cloud variability and mesoscale dynamics from Venus Express / VIRTIS observations at $1.74\mu m$. *Icarus*, 217(2):615–628, 2012.

J. K. Barstow, C. C. C. Tsang, C. F. Wilson, P. G. J. Irwin, F. W. Taylor, **K. McGouldrick**, P. Drossart, G. Piccioni, and S. Tellmann. Models of the global cloud structure on Venus derived from Venus Express observations. *Icarus*, 217(2):542–560, 2012.

K. McGouldrick, O. B. Toon, and D. H. Grinspoon. Sulfuric acid aerosols in the atmospheres of the terrestrial planets. *Planet. Space Sci.*, 59(10):934–941, 2011.

C. C. C. Tsang, C. F. Wilson, J. K. Barstow, P. G. J. Irwin, F. W. Taylor, **K. McGouldrick**, G. Piccioni, P. Drossart, and H. Svedhem. Correlations between cloud thickness and sub-cloud water abundance on Venus. *Geophys. Res. Lett.*, 37:L02202, 2010.

K. McGouldrick and O. B. Toon. Observable effects of convection and gravity waves on the Venus condensational cloud. *Planet. Space Sci.*, 46:1112–1131, 2008.

K. McGouldrick and O. B. Toon. Modeling the effects of shear on the evolution of the holes in the condensational clouds of Venus. *Icarus*, 196:35–48, 2008.

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

K. McGouldrick and O. B. Toon. Investigation of possible causes of the holes in the condensational Venus cloud using a microphysical cloud model with a radiative-dynamical feedback. *Icarus*, 191:1–24, 2007.

Conference Abstracts

K. McGouldrick. Examination of pitential microphysical drivers of NIR emitted radiance variations on the Venus night side. *Joint Meeting of the Japan Geophysical Union and the American Geophysical Union Spring Meeting*, PPS06:P07, 2017.

K. McGouldrick and C. C. C. Tsang. A 145 day period in the Venus condensational clouds. *International Venus Conference, Oxford, England, UK*, 2016.

K. McGouldrick. 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:2191, 2016.

K. McGouldrick and C. C. C. Tsang. Variability of the Venus condensational clouds from analysis of VIRTIS-M-IR observations of the near-infrared spectral windows. *47*$^{\text{th}}$ *Meeting of the DPS, Washington, DC*, 47:201.02, 2015.

K. McGouldrick and L. W. Esposito. Re-analysis of Pioneer Venus UVS SO_2 measurements. *International Venus Conference, Catania, Sicily, Italy*, 2013.

K. McGouldrick. Microphysical model of the Venus clouds between 40km and 80km. *45*$^{\text{th}}$ *Meeting of the DPS, Denver, CO*, 45:118.06, 2013.

K. McGouldrick, L. W. Esposito, K. E. Simmons, M. Dorey, and C. K. Pankratz. Re-analysis of sulfur dioxide variability in the Venus atmosphere using restored Pioneer Venus Orbiter UVS data. *44th DPS Meeting, Reno, NV*, 44:512.03, 2012.

K. McGouldrick. Simulation of the upper clouds and hazes of Venus using a microphysical cloud model. *2012 AGU Fall Meeting, San Francisco, CA*, 2012FA:P13F–03, 2012.

K. McGouldrick. Modelling the microphysics of Venus clouds. *2011 VEXAG conference and science workshop, Chantilly, VA*, 2011.

K. McGouldrick. Microphysical and radiative transfer model of the lower, middle, and upper clouds of Venus. *Joint conference of the DPS and EPSC, Nantes, France*, 43:1609, 2011.

K. McGouldrick, K. Molaverdikhani, L. W. Esposito, and C. K. Pankratz. First results of an investigation of sulfur dioxide in the ultraviolet from Pioneer Venus through Venus Express. *42nd DPS Meeting, Pasadena, CA*, 42:15.03, 2010.

K. McGouldrick, K. H. Baines, T. W. Momary, D. H. Grinspoon, and L. W. Esposito. Observing the clouds of Venus from the ultraviolet to the infrared. *2010 VEXAG Conference and Science Workshop, Madison, WI*, 2010.

K. McGouldrick, O. B. Toon, and D. H. Grinspoon. Sulfuric acid in the clouds of terrestrial planets. *International Conference on Comparative Planetology: Venus–Earth–Mars, Noordwijk, The Netherlands*, 2009.

K. McGouldrick and D. H. Grinspoon. Effects of temporal and spatial variability of insolation on the Venus clouds. *41st DPS Meeting, Fajardo, PR*, 41(3):48.01, 2009.

K. McGouldrick, O. B. Toon, and D. H. Grinspoon. A microphysical basis for lightning on Venus? *40th DPS Meeting, Ithaca, NY*, 40(3):62.09, 2008.

K. McGouldrick, K. H. Baines, T. W. Momary, and D. H. Grinspoon. Observation of the distribution, morphology, and evolution of holes in the Venus clouds with VIRTIS. *Venus Express Science Workshop, La Thuile, Valle d'Aosta, Italy.*, 2008.

K. McGouldrick and O. B. Toon. Modelling the formation and dissipation of holes in the Venus condensational cloud. *39th DPS Meeting, Orlando, FL*, 39(3):58.03, 2007.

K. McGouldrick and O. B. Toon. Exploring the effects of waves on the middle and lower clouds decks of Venus with a microphysical model including a radiative-dynamical feedback. *38th DPS Meeting, Pasadena, CA*, 38(3):526, 2006.

K. McGouldrick and O. B. Toon. Exploring the effects of gravity waves on the Venus condensational cloud with a microphysical model including radiative-dynamical feedback. *AGU Chapman Conference*, Venus as a Terrestrial Planet, 2006.

K. McGouldrick and O. B. Toon. A microphysical model of the Venus condensational cloud with radiative-dynamical feedback. *37th DPS Meeting, Cambridge, England, UK*, 37(3):742, 2005.

K. McGouldrick and O. B. Toon. Modelling the radiative-dynamical feedback in the clouds of Venus. *36th DPS Meeting, Louisville, KY*, 36(3):1163, 2004.

K. McGouldrick and O. B. Toon. Microphysical and radiative modelling of the Venus condensational cloud. *35*th *DPS Meeting, Monterey, CA*, 35(3):983, 2003.

K. McGouldrick and O. B. Toon. Holes in the Venus condensational cloud. *34*th *DPS Meeting, Birmingham, AL*, 34(3):876, 2002.

K. McGouldrick and O. B. Toon. A microphysical model of the 'holey' condensational Venus cloud. *33*rd *DPS Meeting, New Orleans, LA*, 33(3):1037, 2001.

K. McGouldrick, J. Maywalt, L. Engel, B. Rhoads, D. Andersen, and L. Ramsey. Optical fibre evaluation for the Hobby*Eberly Telescope. *193*rd *Meeting of the AAS, Austin, TX*, 30:10.06, 1999.

Teaching

Fall/2015	Instructor (Seminar in Planetary Science) University of Colorado-Boulder, Boulder, CO Topical Seminar for Graduate Students. This semester, the topic was "Venus: Looking Forward from Venus Express." 1 credit-hour; 4 such credit hours are a part of the requirements for the graduate dgree.
Fall/2014	Instructor (Accelerated Introductory Astronomy – The Solar System) University of Colorado-Boulder, Boulder, CO The first part of a two-part survey course for STEM majors covering topics of planetary science. A required course for ASTR majors, an optional elective for several other STEM majors.
Spring/2014	Instructor (Introductory Astronomy – The Solar System) University of Colorado-Boulder, Boulder, CO A survey course for non-majors covering topics of planetary science with a large emphasis on developing critical thinking techniques and a small emphasis on mathematics.
Spring/2013	Part-Time Instructor (Conceptual Physics) Front Range Community College, Westminster, CO A broad survey course covering the majority of topics in the field of Physics, including lab activities, but with limited depth and limited mathematical application.

Student Mentoring Experience

01/2016-present	Hampton University Co-advising graduate student, Ryan McCabe, who is conducting an observational project to study the Venus atmosphere using the ARC 3.5m telescope at Apache Point Observatory, Sunspot, NM.
06/2011-08/2011	NSF Research Experience for Undergraduates Program University of Colorado Boulder Supervised REU student, Eric Petersen, who was involved in a project to help me to analyze the evolution of individual cloud features in the

atmosphere of Venus seen in 1.74μm images taken with the VIRTIS instrument on Venus Express.

EPO Activities

03/2008–present	Part of a three-member team at the Denver Museum of Nature & Science leading a "citizen-scientists" research effort to analyze more than 50,000 near-infrared images of the planet Venus obtained over a ten-year (and growing) span of time.
06/28/2017	Summary of early Akatsuki Science Results: "60 Minutes in Space" at Denver Museum of Nature & Science.
04/18/2017	"Space Cafe" talk at Good Heavens Pub, Shimokitazawa, Tokyo, Japan, on the Akatsuki mission and relevance to exoplanetary studies.
01/19/2017	Authored article, "Akatsuki Returns from the Dead," published by *Boulder Weekly*.
10/01/2016	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.
07/30-31/2016	Facilitated ISAS/JAXA "Open Campus," explaining Akatsuki mission goals and results.
04/27/2016	Summary of Akatsuki Science and the difficulty in its arrival at Venus: "60 Minutes in Space" at Denver Museum of Nature & Science.
03/15/2016	"Tuesday Nerd Talk" at Powder Keg Brewery, Niwot, CO, on the history of international collaboration in Venus research.
05/17/2014	Guest lecture and discussion on Venus observations and Science with the Boulder Astronomy and Space Society.
05/16/2013	Participation as a local "expert" on the planet Venus at a "Science Lounge" outreach event at the Denver Museum of Nature & Science.
06/19/2012	Presentation on observations of Venus for teachers' workshop held at LASP.
06/05/2012	Facilitated Transit of Venus observation activities at Sommers-Bausch Observatory at University of Colorado Boulder.
04/04/2012	LASP Public Lecture on Transits and Observations of Venus
10/18/2011	30-minute presentation about Venus for Junior High students
04/23/2011	Facilitated Astronomy Day activities at Sommers-Bausch Observatory at University of Colorado Boulder.
11/03/2010	Curators' Lunchtime Lecture at Denver Museum of Nature & Science

07/08/2009	Curators' Lunchtime Lecture at Denver Museum of Nature & Science
02/2009	Volunteer Judge at Denver Metro Regional Science Fair
09/24/2008	Curators' Lunchtime Lecture at Denver Museum of Nature & Science
02/2008	Volunteer Judge at Denver Metro Regional Science Fair
02/22/2002	Volunteer Judge at High Peaks Elementary Science Fair
08/1999–08/2007	Hosted multiple Open House Observing Nights and Astronomy Day festivities at Sommers-Bausch Observatory on the campus of University of Colorado Boulder.
08/1994–07/1999	Hosted multiple Open House Observing Nights along with the Penn State Astronomy Club at Davey Lab on the campus of The Pennsylvania State University

Professional Service Activities

01/2016-present	NASA Participating Scientist with the Akatsuki mission, in Residence at the Japan Aerospace Exploration Agency, Institute for Space and Astronautical Science at Sagamihara, Kanagawa, Japan.
02/2017-present	Member of the VEXAG Steering Committee.
05/2017-present	Served as Guest Editor for a Special Issue of *Earth, Planets, Space* about the Akatsuki mission results.
04/2017-present	Served as member of Organizing Committee for the International Venus Conference Held in Niseko, Hokkaido, Japan in September 2018.
01-07/2016	Led a small team tasked with ensuring that space physics topics were adequately addressed in the VEXAG GOI document.
04/2015	Participant and sub-panel assistant chair in Venus Technology and Laboratory Needs Workshop
05/2014	Participant and sub-panel chair in Venus Exploration Targets Workshop
05/2013-09/2014	Member of VEXAG Goals, Objectives, and Investigations document committee.
–	Served on 4 NASA Review panels at various times, and have particpated in the review process as an external reviewer. Programs inlcude: Planetary Data Archiving, Restoration, and Tools, Outer Planets, Planetary Atmospheres, Cassini Data Analysis, and Jupiter Data Analysis.
–	Peer Reviewer of 11 original research articles that had been submitted to Advances in Space Research, *Icarus*, *Journal of Geophysical Research: Planets*, *Planetary and Space Science*, *Arabian Journal of Chemistry*, and *Astrophysical Journal Letters*; and of a review article on planetary atmospheres.

Professional Memberships

American Astronomical Society (January 1999 – present)

AAS: Division for Planetary Sciences (October 2000 – present)

American Geophysical Union (August 2012 – present)

Japan Geophysical Union (October 2016 – present)

Foreign Languages

Latin: Third semester proficiency college-level Latin at Penn State.

Japanese: Beginner I and II courses with the Japan America Society of Colorado.

September 6, 2017