

## CURRICULUM VITAE

### **Terry Deshler**

Department of Atmospheric Science  
University of Wyoming, Laramie, WY 82071  
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### **EDUCATION**

Ph.D., **Physics**, University of Wyoming, May 1982  
M. S., **Atmospheric Sciences**, University of Wyoming, August 1975  
B. A., **Mathematics**, University of Wyoming, June 1969

### **PROFESSIONAL EXPERIENCE**

September 2016 – Present: **Research Scientist** part-time, Laboratory for Atmospheric and Space Physics, University of Colorado, 1234 Innovation Drive, Boulder, Colorado.  
August 1991 – Present: **Professor Emeritus**, Dept. of Atmospheric Science, University of Wyoming:  
**Professor**, August 1999 – August 2014; **Associate Professor**, July 1994 – July 1999; **Assistant Professor**, August 1991 - June 1994.  
May 1988 - July 1991: **Research Scientist**, Department of Physics and Astronomy, University of Wyoming.  
Jan. 1985 - April 1988: **Meteorologist**, Bureau of Reclamation, US Department of Interior, Auburn, CA.  
May 1982 - Dec. 1984: **Software Engineer**, In-Situ Inc., Laramie, WY  
Jan. 1980 - May 1982: **Graduate Research Assistant**, Department of Atmospheric Science, University of Wyoming  
Sept. 1978 - Jan. 1980: **Graduate Teaching Assistant**, Department of Physics and Astronomy, University of Wyoming  
May 1976 - August 1976: **Support Scientist II**, National Center for Atmospheric Research, Boulder, CO  
June 1974 - Jan. 1975: **Radar Meteorologist**, Atmospherics Inc., Fresno, CA (Duty station, Kericho, Kenya)  
June 1972 - May 1974: **Graduate Research Assistant**, Department of Atmospheric Science, University of Wyoming  
Sept. 1969 - Dec. 1971: **Peace Corps Volunteer**, Action, Washington, DC (Duty station, Kisii, Kenya)

### **HONORS AND AWARDS**

Presidential Research Award and Presidential Speaker, University of Wyoming, April 2005.  
Editor's citation for excellence in refereeing., *Journal Geophysical Research*, May 2002.  
Outstanding Graduate Teaching/Research Award, College of Engineering, Univ. of Wyoming, May 2002.  
Special Achievement Award, Bureau of Reclamation, June 1985.  
Phi Kappa Phi, University of Wyoming, 1974.  
Three Year Master's program scholarship, Mathematics, University of Wyoming, 1967.

### **MEMBERSHIPS**

American Meteorological Society, since 1979  
American Geophysical Union, since 1988

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## REFEREED PUBLICATIONS (Reverse Chronological)

### Book Chapters

- Deshler, T. (2016), In situ observations of volatile and non-volatile particle size distributions from balloon-borne platforms, Ch. 7 in *Volcanic Ash Hazard Observation*, Eds: S. Mackie, K. Cashman, H. Ricketts, A. Rust, M. Watson, Elsevier, 27 May 2016.
- Deshler, T., R. Anderson-Sprecher, J. Barnes, B. Clemesha, S. Godin-Beekmann, R. G. Grainger, D. J. Hofmann, H. Jäger, S. Marsh, M. Osborn, and D. Simonich, Non-volcanic stratospheric aerosol trends: 1971 - 2004, Chapter 5 of the *SPARC Assessment of Stratospheric Aerosol Properties* (L. W. Thomason and Th. Peter editors), WCRP-124, WMO/TD-No. 1295, SPARC Report No. 4, February 2006.
- Hofmann, D., J. Barnes, E. Dutton, T. Deshler, H. Jäger, R. Keen, and M. Osborn, Surface-based observations of volcanic emissions to the stratosphere, in *Volcanism and the Earth's Atmosphere, Geophys. Monogr 139*, edited by A. Robock and C. Oppenheimer, pp. 57-73, AGU, Washington, D.C., 2003.
- Poole, L., S. Godin, S. Bekki, T. Deshler, N. Larsen, and T. Peter, Global distributions and changes in stratospheric particles, Chapter 3 in WMO, *Scientific Assessment of Ozone Depletion: 1998*, World Meteorological Organization, Global Ozone Research and Monitoring Project Report 44, Geneva, Switzerland, 1999.

### Scientific Journals

----- Submitted -----

Tilmes et al., ...

- Nicholas Ernest, Larry W. Thomason, Terry Deshler, Producing aerosol size distributions consistent with optical particle counters measurements using space-based measurements of aerosol extinction coefficient, in process
- Francesco Cairo, Terry Deshler, Luca Di Liberto, Andrea Scoccione, and Marcel Snels, A study of optical scattering modelling for mixed phase Polar Stratospheric Clouds, *Atmospheric Measurement Technology*, October 2022.
- Juan-Carlos Antuña-Marrero<sup>1</sup>, Graham W. Mann<sup>2,3</sup>, John Barnes<sup>4</sup>, Abel Calle<sup>1</sup>, Sandip S. Dhomse<sup>2,5</sup>, Victoria E. Cachorro Revilla<sup>1</sup>, Terry Deshler<sup>6</sup>, Li Zhengyao<sup>2</sup>, Nimmi Sharma<sup>7</sup> and Louis Elterman, Rescued and recalibrated aerosol extinction searchlight profiles at White Sands, New Mexico, US, after 1963 Agung eruption, *Earth System Science Data Journal*, July 2022
- J. Douglas Goetz<sup>1</sup>, Lars K. Kalnajs<sup>1</sup>, Terry Deshler<sup>1</sup>, Sean Davis<sup>2</sup>, Martina Bramberger<sup>3</sup>, M. Joan Alexander, A Fiber Optic Distributed Temperature Sensor for Continuous *in situ* Profiling 2 km Beneath Constant-altitude Scientific Balloons, *Atmos. Meas. Tech.*, March 2022

----- In Press/accepted (see [http://www-das.uwyo.edu/~deshler/desh\\_pubs\\_presnt.htm](http://www-das.uwyo.edu/~deshler/desh_pubs_presnt.htm)) -----

----- 2022----- (3, 153)

- Kalnajs, L. E., & Deshler, T. (2022). A New Instrument for Balloon-Borne In Situ Aerosol Size Distribution Measurements, the Continuation of a 50 Year Record of Stratospheric Aerosols Measurements. *Journal of Geophysical Research: Atmospheres*, 127(24), e2022JD037485. <https://doi.org/10.1029/2022JD037485>
- Bramberger, M., Alexander, M. J., Davis, S., Podglajen, A., Hertzog, A., Kalnajs, L., Deshler, T., Goetz, J. D., & Khaykin, S. (2022). First Super-Pressure Balloon-Borne Fine-Vertical-Scale Profiles in the Upper TTL: Impacts of Atmospheric Waves on Cirrus Clouds and the QBO. *Geophysical Research Letters*, 49(5), e2021GL097596. <https://doi.org/10.1029/2021GL097596>
- Tidiga, M.; Berthet, G.; Jégou, F.; Kloss, C.; Bègue, N.; Vernier, J.-P.; Renard, J.-B.; Bossolasco, A.; Clarisse, L.; Taha, G.; Portafaix, T.; Deshler, T.; Wienhold, F.G.; Godin-Beekmann, S.; Payen, G.; Metzger, J.-M.; Duflot, V.; Marquestaut, N. Variability of the Aerosol Content in the Tropical Lower Stratosphere from 2013 to 2019: Evidence of Volcanic Eruption Impacts. *Atmosphere* **2022**, *13*, 250. <https://www.mdpi.com/2073-4433/13/2/250>

----- 2021----- (4, 150)

- Li, Y., Dykema, J., Deshler, T., & Keutsch, F. (2021). Composition Dependence of Stratospheric Aerosol Shortwave Radiative Forcing in Northern Midlatitudes. *Geophysical Research Letters*, 48(24), e2021GL094427. <https://doi.org/10.1029/2021GL094427>
- Mahnke, C., Weigel, R., Cairo, F., Vernier, J.-P., Afchine, A., Krämer, M., Mitev, V., Matthey, R., Viciani, S., D'Amato, F., Ploeger, F., Deshler, T., & Borrmann, S. (2021). The Asian tropopause aerosol layer within the 2017 monsoon anticyclone: Microphysical properties derived from aircraft-borne in situ measurements. *Atmospheric Chemistry and Physics*, 21(19), 15259–15282. <https://doi.org/10.5194/acp-21-15259-2021>
- Kalnajs, L. E., Davis, S. M., Goetz, J. D., Deshler, T., Khaykin, S., St. Clair, A., Hertzog, A., Bordereau, J., & Lykov, A. (2021). A reel-down instrument system for profile measurements of water vapor, temperature, clouds, and aerosol beneath constant-altitude scientific balloons. *Atmospheric Measurement Techniques*, 14(4), 2635–2648. <https://doi.org/10.5194/amt-14-2635-2021>
- Snels, M., Cairo, F., Di Liberto, L., Scoccione, A., Bracaglia, M., & Deshler, T. (2021). Comparison of Coincident Optical Particle Counter and Lidar Measurements of Polar Stratospheric Clouds Above McMurdo (77.85°S, 166.67°E) From 1994 to 1999. *Journal of Geophysical Research: Atmospheres*, 126(6), e2020JD033572. <https://doi.org/10.1029/2020JD033572>

----- 2020----- (1, 146)

- Nyaku, E., Loughman, R., Bhartia, P. K., Deshler, T., Chen, Z., & Colarco, P. R. (2020). A comparison of lognormal and gamma size distributions for characterizing the stratospheric aerosol phase function from optical particle counter measurements. *Atmospheric Measurement Techniques*, 13(3), 1071–1087. <https://doi.org/10.5194/amt-13-1071-2020>

----- 2019----- (2, 145)

- Deshler, T., Luo, B., Kovilakam, M., Peter, T., & Kalnajs, L. E. (2019). Retrieval of Aerosol Size Distributions From In Situ Particle Counter Measurements: Instrument Counting Efficiency and Comparisons With Satellite Measurements. *Journal of Geophysical Research: Atmospheres*, 124(9), 5058–5087. <https://doi.org/10.1029/2018JD029558>
- Snels, M., Scoccione, A., Di Liberto, L., Colao, F., Pitts, M., Poole, L., Deshler, T., Cairo, F., Cagnazzo, C., & Fierli, F. (2019). Comparison of Antarctic polar stratospheric cloud observations by ground-based and space-borne lidar and relevance for chemistry–climate models. *Atmospheric Chemistry and Physics*, 19(2), 955–972. <https://doi.org/10.5194/acp-19-955-2019>

----- 2018----- (3, 142)

- Rasmussen, R. M., Tessoroff, S. A., Xue, L., Weeks, C., Ikeda, K., Landolt, S., Breed, D., Deshler, T., & Lawrence, B. (2018). Evaluation of the Wyoming Weather Modification Pilot Project (WWMPP) Using Two Approaches: Traditional Statistics and Ensemble Modeling. *Journal of Applied Meteorology and Climatology*, 57(11), 2639–2660. <https://doi.org/10.1175/JAMC-D-17-0335.1>
- Günther, A., Höpfner, M., Sinnhuber, B.-M., Griessbach, S., Deshler, T., von Clarmann, T., & Stiller, G. (2018). MIPAS observations of volcanic sulfate aerosol and sulfur dioxide in the stratosphere. *Atmospheric Chemistry and Physics*, 18(2), 1217–1239. <https://doi.org/10.5194/acp-18-1217-2018>
- Höpfner, M., Deshler, T., Pitts, M., Poole, L., Spang, R., Stiller, G., & Clarmann, T. von. (2018). The MIPAS/Envisat climatology (2002–2012) of polar stratospheric cloud volume density profiles. *Atmospheric Measurement Techniques*, 11(10), 5901–5923. <https://doi.org/10.5194/amt-11-5901-2018>

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- Vernier, J.-P., Fairlie, T. D., Deshler, T., Venkat Ratnam, M., Gadhavi, H., Kumar, B. S., ... Renard, J.-B. (2017). BATAL: The Balloon Measurement Campaigns of the Asian Tropopause Aerosol Layer. *Bulletin of the American Meteorological Society*, 99(5), 955–973. <https://doi.org/10.1175/BAMS-D-17-0014.1>
- Deshler, T., Stübi, R., Schmidlin, F. J., Mercer, J. L., Smit, H. G. J., Johnson, B. J., Johnson, Rigel Kivi, Nardi, B. (2017). Methods to homogenize electrochemical concentration cell (ECC) ozonesonde measurements across changes in sensing solution concentration or ozonesonde manufacturer. *Atmospheric Measurement Techniques*, 10(6), 2021–2043. <https://doi.org/10.5194/amt-10-2021-2017>

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- Vernier, J.-P., T. D. Fairlie, T. Deshler, M. Natarajan, T. Knepp, K. Foster, F. G. Wienhold, K. M. Bedka, L. Thomason, and C. Trepte (2016). In situ and space-based observations of the Kelud volcanic plume:

- The persistence of ash in the lower stratosphere, *J. Geophys. Res. Atmos.*, *121*, 11,104–11,118, doi:[10.1002/2016JD025344](https://doi.org/10.1002/2016JD025344).
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- Kremser, S., L.W. Thomason, M. von Hobe, M. Hermann, T. Deshler, C. Timmreck, M. Tooney, A. Stenke, J. P. Schwarz, R. Weigel, S. Fueglistaler, F. Prata, J-P. Vernier, H. Schlager, J. Barnes, J-C. Antuña-Marrero, D. Fairlie, M. Palm, E. Mahieu, J. Notholt, M. Rex, C. Bingen, F. Vanhellefont, A. Bourassa, J. M. C. Plane, D. Klocke, S. A. Carn, L. Clarisse, T. Trickl, R. Neely, A. D. James, L. Rieger, J. C. Wilson, and B. Meland, (2016), Stratospheric aerosol - Observations, processes, and impact on climate, *Rev. Geophys.*, *54*, doi: [10.1002/2015RG000511](https://doi.org/10.1002/2015RG000511).
- Hermann, M. A. Wigelt, D. Assmann, S. Pfeifer, T. Muller, T. Conrath, J. Voigtlander, J. Heintzenberg, A. Wiedensohler, B. G. Martinsson, T. Deshler, C. A. M. Brenninkmeijer, and A. Zahn (2016), An optical particle size spectrometer for aircraft-borne measurements in IAGOS-CARIBIC, *Atmos. Meas. Tech.*, *9*, 2179–2194, doi:10.519/amt-9-2179-2016.
- 2015 -----(4, 135)
- Kovilakam, M., and T. Deshler (2015), On the accuracy of stratospheric aerosol extinction derived from in situ size distribution measurements and surface area density derived from remote SAGE II and HALOE extinction measurements, *J. Geophys. Res.*, *120*, 8426–8447, doi:10.1002/2015JD023303.
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- Deshler, T., (2015) Observations for Chemistry (In Situ): Particles, *Encyclopedia of Atmospheric Science*, Academic Press.
- Ritzman, J. M., T. Deshler, K. Ikeda, R. Rasmussen (2015), Estimating the fraction of winter orographic precipitation produced under conditions meeting the seeding criteria for the Wyoming weather modification pilot project, *J. Appl. Met. Clim.*, *54*, 1202–1215.
- 2014 -----(6, 131)
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- Ridley, D. A., S. Solomon, J. E. Barnes, V. D. Burlakov, T. Deshler, S. I. Dolgii, A. B. Herber, T. Nagai, R. R. Neely III, A. V. Nevzorov, C. Ritter, T. Sakai, B. D. Santer, M. Sato, A. Schmidt, O. Uchin, and J. P. Vernier (2014), Total volcanic stratospheric aerosol optical depths and implications for global climate change, *Geophys. Res. Lett.*, *41*, 7763–7769, doi: [10.1002/2014GL061541](https://doi.org/10.1002/2014GL061541).
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- Campbell, P., M. Mills, and T. Deshler (2014), The global extent of the mid stratospheric CN layer: A three-dimensional modeling study, *J. Geophys. Res. Atmos.*, *119*, doi:[10.1002/2013JD020503](https://doi.org/10.1002/2013JD020503).
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- Campbell, P., and T. Deshler (2014), Condensation nuclei measurements in the midlatitude (1982–2012) and Antarctic (1986–2010) stratosphere between 20 and 35 km, *J. Geophys. Res. Atmos.*, *119*, doi:[10.1002/2013JD019710](https://doi.org/10.1002/2013JD019710).
- 2013 -----(2, 125)

Bourassa, A. E., A. Robock, W. J. Randel, T. Deshler, L. A. Rieger, N. D. Lloyd, E. J. Llewellyn, and D. A. Degenstein (2013) Response to Comments on "Large Volcanic Aerosol Load in the Stratosphere Linked to Asian Monsoon Transport", *Science*, 339, 647, 2013. DOI: 10.1126/science.1227961

Gazeaux, J., Clerbaux, C., George, M., Hadji-Lazaro, J., Kuttippurath, J., Coheur, P.-F., Hurtmans, D., Deshler, T., Kovilakam, M., Campbell, P., Guidard, V., Rabier, F., and Thépaut, J.-N.: Intercomparison of polar ozone profiles by IASI/MetOp sounder with 2010 Concordiasi ozonesonde observations, *Atmos. Meas. Tech.* 6, 613–620, 2013, [www.atmos-meas-tech.net/6/613/2013/](http://www.atmos-meas-tech.net/6/613/2013/) doi:10.5194/amt-6-613-2013.

----- 2012 -----(1, 123)

Bourassa, A. E., A. Robock, W. J. Randel, T. Deshler, L. A. Rieger, N. D. Lloyd, E. J. Llewellyn, and D. A. Degenstein (2012), Large volcanic aerosol load in the stratosphere linked to Asian monsoon transport, *Science*, 337, 78-81.

----- 2011 -----(3, 122)

Kravitz, B., A. Robock, A. Bourassa, T. Deshler, D. Wu, I. Mattis, F. Finger, A. Hoffmann, C. Ritter, L. Bitar, T. J. Duck, and J. E. Barnes, (2011), Simulation and observations of stratospheric aerosols from the 2009 Sarychev volcanic eruption, *J. Geophys. Res.*, 116, D18211, doi:10.1029/2010JD015501.

Vernier, J.-P., Pommereau, J.-P., Thomason, L. W., Pelon, J., Garnier, A., Deshler, T., Jumelet, J., and Nielsen, J. K.: Overshooting of clean tropospheric air in the tropical lower stratosphere as seen by the CALIPSO lidar, *Atmos. Chem. Phys.*, 11, 9683-9696, doi:10.5194/acp-11-9683-2011, 2011.

Cai, Y, D. Montague, T. Deshler, Comparison of measured and calculated scattering from surface aerosols with an average, a size, and a time dependent refractive index, *J. Geophys. Res.*, 116, D02202, doi:10.1029/2010JD014607, 2011.

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Borrmann, S., Kunkel, D., Weigel, R., Minikin, A., Deshler, T., Wilson, J. C., Curtius, J., Volk, C. M., Homan, C. D., Ulanovsky, A., Ravegnani, F., Viciani, S., Shur, G. N., Belyaev, G. V., Law, K. S., and Cairo, F.: Aerosols in the tropical and subtropical UT/LS: in-situ measurements of submicron particle abundance and volatility, *Atmos. Chem. Phys.*, 10, 5573-5592, doi:10.5194/acp-10-5573-2010, 2010.

Wurl, D., Grainger, R. G., McDonald, A. J., and Deshler, T.: Optimal estimation retrieval of aerosol microphysical properties from SAGE-II satellite observations in the volcanically unperturbed lower stratosphere, *Atmos. Chem. Phys.*, 10, 4295-4317, doi:10.5194/acp-10-4295-2010, 2010

Cairo, F., Pommereau, J. P., Law, K. S., Schlager, H., Garnier, A., Fierli, F., Ern, M., Streibel, M., Arabas, S., Borrmann, S., Berthelot, J. J., Blom, C., Christensen, T., D'Amato, F., Di Donfrancesco, G., Deshler, T., Diedhiou, A., Durré, G., Engelsen, O., Goutail, F., Harris, N. R. P., Kerstel, E. R. T., Khaykin, S., Konopka, P., Kylling, A., Larsen, N., Lebel, T., Liu, X., MacKenzie, A. R., Nielsen, J., Oulanowski, A., Parker, D. J., Pelon, J., Polcher, J., Pyle, J. A., Ravegnani, F., Rivière, E. D., Robinson, A. D., Röckmann, T., Schiller, C., Simões, F., Stefanutti, L., Stroh, F., Some, L., Siegmund, P., Sitnikov, N., Vernier, J. P., Volk, C. M., Voigt, C., von Hobe, M., Viciani, S., and Yushkov, V.: An introduction to the SCOUT-AMMA stratospheric aircraft, balloons and sondes campaign in West Africa, August 2006: rationale and roadmap, *Atmos. Chem. Phys.*, 10, 2237-2256, 2010.

Rabier, F., A. Bouchard, E. Brun, A. Doerenbecher, S. Guedj, V. Guidard, F. Karbou, V. Peuch, L. El Amraoui, D. Puech C. Genthon, G. Picard, M. Town, A. Hertzog, F. Vial, P. Cocquerez, S. A. Cohn, T. Hock, J. Fox, H. Cole, D. Parsons, J. Powers, K. Romberg, J. VanAndel, T. Deshler, J. Mercer, J. S. Haase, L. Avallone, L. Kalnajs, C. R. Mechoso, A. Tangborn, A. Pellegrini, Y. Frenot, J. Thépaut, A. McNally, G. Balsamo, P. Steinle, The Concordiasi project in Antarctica, *Bull. Amer. Meteor. Soc.*, DOI :10.1175/2009BAMS2764.1, 69-86, 2010.

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Eidhammer, T., D. C. Montague, and T. Deshler (2008), Determination of index of refraction and size of supermicrometer particles from light scattering measurements at two angles, *J. Geophys. Res.*, 113, D16206, doi:10.1029/2007JD009607.

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**INVITED PRESENTATIONS (Reverse Chronological)**

- Profiling of the tropical tropopause layer with in situ instruments deployed from Strateole2 long duration balloons, HEMERA Summer School, Heidelber, Germany, 13 September 2019.
- New aerosol instruments to maintain current in situ measurement capability with small balloons, HEMERA Summer School, Heidelber, Germany, 10 September 2019.
- Early and modern stratospheric science using small and medium sized, unpressurized balloons: aerosol and ozone, HEMERA Summer School, Heidelber, Germany, 9 September 2019.
- In situ measurements in the UTLS from sounding and drifting balloons: Recent examples and new possibilities, Terry Deshler, Workshop on Assessing availability and quality of chemical composition measurements in the upper troposphere/lower stratosphere (UTLS) from multiple instrument platforms, Geneva, Switzerland, 24-27 May 2016.
- The Measured Stratospheric Sulfur Burden, Terry Deshler, Second SSiRC Workshop on Stratospheric Sulfate and its Role in Climate, Potsdam, Germany, 25-28 April, 2016.
- Measuring the aerosol size distribution profile in the next big volcanic eruption. What is required? Terry Deshler, American Geophysical Union fall meeting, San Francisco, 14-18 December 2015.
- Long Term Stratospheric Aerosol Measurements using In Situ Particle Counters: Challenges, Validation, Importance, T. Deshler, SPARC Workshop, Boulder, Colorado, 9-10 November, 2015.
- Quasi-Lagrangian measurements of the nitric acid trihydrate nucleation rate in the late austral winter, T. Deshler, S. Ward, A. Hertzog, Polar Stratospheric Cloud Workshop, Zurich, Switzerland, 27-29 August, 2014.
- Fifty years of Balloon-borne Measurements of Stratospheric Aerosol, T. Deshler, First SSiRC Workshop on Stratospheric Sulfate and its Role in Climate, Atlanta, Georgia, 27-31 Oct. 2013.
- In Situ Measurements of Stratospheric Aerosol from Balloon-borne Platforms, T. Deshler and M. Kovilakam, Monitoring of Geoengineering Effects and their Natural and Anthropogenic Analogues – Part II - workshop Keck Institute for Space Studies, Pasadena, California, Nov 15, 16, 2011.
- IPY Discoveries Within the Linked Spheres of Ice, Water, and Air: From Sea Ice to Stratosphere, T. Deshler and Cecelia Bitz, National Academies workshop on the “Legacies and Lessons of International Polar Year 2007-2008”, Leesburg, Virginia, June 14-15, 2011.
- Stratospheric Aerosol – Aerosol Sources, Measurement History, Recent Changes, and Why We Care, International Workshop on Asian Summer Monsoon and Its Role in Global Stratosphere – Troposphere Exchange, Lhasa, China, July 21-23, 2010.
- Eighteen Years of Recovering Balloon-borne Instruments Parachuted from the Edge of Space, Antarctic to Arctic, T. Deshler, *Argos User's Conference*, Annapolis, Maryland, October, 2008.
- Stratospheric Aerosol from Pole to Pole: Balloonborne In Situ Observations, T. Deshler, NOAA/ESRL Global Monitoring Annual Conference - 2008, *David J. Hofmann Recognition Session*, Boulder, Colorado, May 2008
- In Situ Measurements of Stratospheric Aerosol from Balloon-borne Platforms, 4<sup>th</sup> *International Atmospheric Limb Workshop*, Virginia Beach, Virginia, Oct 29 – Nov 2, 2007.
- Stratospheric Aerosol: Measurements, Importance, Life Cycle, Anomalous Aerosol, 17<sup>th</sup> *International Conference Nucleation and Atmospheric Aerosol*, pp 613-624, Galway, Ireland, August 2007.

- Aerosol measurement (in situ), *Workshop on aerosol in the upper troposphere/lower stratosphere*, University of Oxford, Oxford, UK, December 2003.
- Long term surface and in situ measurements of stratospheric aerosol: A comparison of volcanically perturbed and quiescent stratospheric periods, *International Union of Geodesy and Geophysics*, Sapporo, Japan, July 2003, T. Deshler, J. M. Rosen, D. J. Hofmann, B. Weatherhead, H. Jäger, M. T. Osborn, B. R. Clemesha, and J. B. Liley.
- Large nitric acid particles at the top of an Arctic stratospheric cloud, *Sixth European symposium on stratospheric ozone*, Göteborg, Sweden, September 2002, T. Deshler, N. Larsen, C. Weisser, J. Schreiner, K. Mauersberger, F. Cairo, A. Adriani, G. Di Donfrancesco, J. Ovarlez H. Ovarlez, U. Blum, K.H. Fricke, and A. Dörnbrack.
- Stratospheric aerosol in the mid latitudes of both hemispheres: Balloonborne measurements of particle size distribution spanning 30 years in the north and 10 years in the south, *Symposium on Global Aerosol Climatology Database*, Portland, October 2001, T. Deshler, M. E. Hervig, J. M. Rosen, D. J. Hofmann, J. B. Liley.
- The Antarctic winter stratosphere, a natural laboratory for studying polar stratospheric clouds, *McMurdo Winter Workshop*, National Science Foundation, Arlington, Virginia, September 1999.
- Comparison of aerosol size distributions in the north and south polar latitudes using in situ measurements, *32nd COSPAR Scientific Assembly*, Tokyo, Japan, July 1998.
- Estimating the index of refraction of polar stratospheric clouds above Scandinavia by combining in situ and lidar measurements, *Arctic Ozone Data Workshop*, Tokyo, December 1997, T. Deshler, B. Nardi, A. Adriani, F. Cairo, G. Hansen, F. Fierli.
- The characterization of polar stratospheric clouds above Scandinavia by combining in situ and lidar measurements, *Fourth European symposium on polar stratospheric ozone*, Schliersee, Germany, September, 1997, T. Deshler, B. Nardi, A. Adriani, F. Cairo, G. Hansen, F. Fierli.
- Observations of Polar Stratospheric Clouds, *Symposium Commemorating the tenth anniversary of the National Ozone Expedition (NOZE-1)*, Boulder, Colorado, August, 1996.
- Stratospheric aerosol decay rates following Pinatubo, and current non-volcanic stratospheric aerosol levels: Comparison of the north and south midlatitudes using in situ measurements, *31st COSPAR Scientific Assembly*, Birmingham, UK, July 1996.
- Balloonborne measurements of volcanic aerosol at 41°N following the eruptions of Pinatubo and El Chichón: Comparisons of size distributions and surface areas, Effects of Pinatubo Session *International Union of Geodesy and Geophysics*, Boulder, Colorado, July 1995.
- Balloonborne measurements of aerosol over Kiruna, Sweden (68°N), the winters of 1990 to 1993, and comparisons with Antarctic measurements, *International Symposium of Polar and Tropical Atmospheres*, Nagoya, Japan, November, 1994.
- Balloon and aircraft measurements of PSCs and sulfate aerosols, Keynote presentation, *Heterogeneous Chemistry Workshop*, Boulder, Colorado, November 1993.
- Review of current knowledge of polar stratospheric clouds: structure and impact, *European Geophysical Society XVIII General Assembly*, Weisbaden, Germany, May 1993.
- Measurement techniques for stratospheric aerosols. Tutorial presented to the "Panel on Atmospheric Effects of Stratospheric Aircraft" at the *National Academy of Sciences*, Washington, DC, April 1993.
- Balloonborne Measurements of Pinatubo Aerosol During Summer and Fall 1991, Size Distribution and Volatility, *Chapman Conference on Climate, Volcanism and Global Change*, Hilo, Hawaii, Amer. Geophys. Union, March 1992.

#### **SEMINARS (Reverse Chronological)**

- In situ measurements of stratospheric aerosol: How they're made and why they're useful, 20 September 2021, VolImpact Summer School, via Zoom
- In situ measurements of stratospheric aerosol: How they're made and why they're useful, 28 May 2021, Harvard Stratospheric Group, via Zoom
- Investigations of the tropical tropopause layer using in situ instruments fixed to and deployed from long duration balloons during the Strato2 engineering campaign, November 2019 - February 2020. Webinar University of Greifswald, 6 August 2020.

The Measured Stratospheric Sulfur Burden, *Conziglio Nazionale delle Ricerche, Istitutoe di Scienze dell'Atmospheric e del Clima*, Rome, Italy, May 19, 2016.

Polar stratospheric clouds, *Conziglio Nazionale delle Ricerche, Istitutoe di Scienze dell'Atmospheric e del Clima*, Rome, Italy, May 12, 2016.

In situ measurements of stratospheric aerosol: The Wyoming Record, NASA Langley, Hampton, Virginia, March 24, 2016.

In situ measurements of stratospheric aerosol: Why they are important and how they are made. Indian National Atmospheric Research Laboratory, Gadanki, India, 14 August, 2015.

The stratosphere – Home to ozone and aerosol particles – Why we care, Morehouse College, Atlanta, October 31, 2013

Fifty years of stratospheric aerosol measurements, University of Wyoming, August 28, 2013.

Toward a more accurate estimate of global stratospheric aerosol surface area density. Is it important? Department of Atmospheric Science, University of Wyoming, Laramie, December 2009.

Toward a more accurate estimate of global stratospheric aerosol surface area density. Is it important? Department of Atmospheric and Oceanic Sciences , University of Colorado, Boulder, May 2009.

Antarctic ozone loss - plans for a quantitative test in 2003, Department of Physics and Astronomy, University of Canterbury, Christchurch, New Zealand, February 2003.

In situ measurements of clouds in the polar stratosphere, particle size and number: Instrumental techniques, Applications in the Arctic and Antarctic, and Analyses, IMK Forschungszentrum, Karlsruhe, Germany, April 2002.

Polar ozone loss and polar stratospheric clouds, Civil and Architectural Engineering and Chemical Engineering, Environmental Engineering Graduate Seminar Series, University of Wyoming, April 2002

Polar ozone loss and polar stratospheric clouds, Department of Physics and Astronomy, University of Canterbury, Christchurch, New Zealand, March 2001.

Indices of refraction of polar stratospheric cloud particles inferred from balloonborne measurements of the physical and optical properties of the cloud, Centre for Atmospheric Science, Chemistry Dept., Cambridge University, Cambridge, UK, December 2000.

Vertical profiles of stratospheric aerosol using in situ measurements, a global survey, Department of Physics, Oxford University, Oxford, UK, February 1997.

Progress in understanding polar ozone depletion, Physics Department, Utah State University, Logan, Utah, November, 1995.

The impact of atmospheric aerosols on atmospheric processes and climate. *Series of invited lectures to the National Research Council*, Rome, Italy, June 1995.

Stratospheric aerosol measurements in the mid latitudes and the polar regions, National Center for Atmospheric Research, Boulder, CO, May, 1995.

Polar stratospheric clouds, a review and current confusion, Seminar at the Max-Planck-Institut für Kernphysik, Heidelberg, Germany, 13 May 1993.

Structure and impact of polar stratospheric clouds, Seminar at the Fraunhofer Institut für Atmosphärische Umweltforschung, Garmisch-Partenkirchen, Germany, 10 May 1993.

Review of current techniques for the measurement of atmospheric aerosol particles in situ, capabilities and problems, NOAA/ERL Climate Monitoring and Diagnostics Laboratory, Boulder, CO, April 1993.

Structure and impact of polar stratospheric clouds, Colloquium for the Department of Atmospheric Science, Laramie, Wyoming, April 1993.

#### **CONFERENCE PAPERS/PRESENTATIONS (Reverse Chronological)**

In Situ Measurements Of Stratospheric Aerosol Size Distributions During The Post Pinatubo Period And In Preparation For The Next Major Volcanic Eruption, L. Kalnajs, T. Deshler, Chapman Conference, Puerto de la Cruz, Tenerife, Spain, March 2018.

Retrieval of aerosol size distributions from *in situ* particle counter measurements accounting for instrument counting efficiency, and comparisons with satellite measurements of extinction and estimates of aerosol surface area. T. Deshler, M. Kovilakam. B. Luo, T. Peter, L. Kalnajs, poster, Chapman Conference, Puerto de la Cruz, Tenerife, Spain, March 2018.

The stratospheric sulfur burden: an assessment based on gas and particle phase measurements. T. Deshler, Corinna Kloss, Larry Willis Thomason, Michael Hoepfner, Bengt G Martinsson, Stefanie Kremser,

Adam E Bourassa, Norbert Glatthor, John Edward Barnes, Marc von Hobe, Markus Hermann, Nicholas B Jones, Thomas Trickl, Justus Notholt, James C Wilson, Mathias Palm, Dan Smale, James W Hannigan, Chapman Conference, Puerto de la Cruz, Tenerife, Spain, March 2018.

Retrieval of size distributions from in situ particle counter measurements, T. Deshler, M. Kovilakam, T. Peter, B. Luo, L. Kalnajs, Stratospheric aerosol workshop sponsored by SSiRC, September, 2017.

A new generation of in situ instruments for stratospheric aerosol and CN measurements, L. Kalnajs, T. Deshler, Stratospheric aerosol workshop sponsored by SSiRC, September, 2017.

In situ measurements of the non-sulfate fraction of volcanic aerosol following the Pinatubo (1991) and Kelud (2014) eruptions, European Geophysical Union annual meeting, Vienna, Austria, April 19, 2016.

PDFs of Lognormal Parameters from In Situ PSC measurements above McMurdo Station and Kiruna, European Geophysical Union annual meeting, Vienna, Austria, April 19, 2016.

Quasi-Lagrangian measurements of the nitric acid trihydrate nucleation rate in the late austral winter, Open scientific conference of Scientific Committee on Antarctic Research (SCAR), Auckland, New Zealand, August 26, 2014.

Derivation of transfer functions to homogenize ozone measurements made with Science Pump and Ensci ozone sondes and using 1.0% or 0.5% KI solutions, T. Deshler, H. Smit, R. Stübi, R. Kivi, Quadrennial Ozone Symposium, Toronto, Canada, 27-31 August 2012.

The Concordiasi field experiment over Antarctica: First results from innovative atmospheric measurement, Terry Deshler et al., Open scientific conference of Scientific Committee on Antarctic Research (SCAR), Portland, Oregon, July 2012.

Differences in Antarctic Ozone Loss During Chlorine Maximum: The Past Two Decades, Stephanie Luberda and Terry Deshler, Open scientific conference of Scientific Committee on Antarctic Research (SCAR), Buenos Aires, Argentina, August 2010.

In Situ Measurements of Stratospheric Aerosol from Balloon-borne Platforms. T. Deshler, SPARC Volcano workshop, Zurich, Switzerland, July 2009.

Toward a more accurate estimate of global stratospheric aerosol surface area density. Is it important? T. Deshler, J. L. Mercer, M. Kovilakam, J. M. Rosen, D. J. Hofmann, S. Solomon, J. F. Lamarque, P. J. Young, NOAA Global Monitoring Division annual meeting, May 2009, Boulder, CO.

Chemical origin, role of KI, KBr, buffer in ozonesondes? T. Deshler, J. Mercer, L. Baran, NDACC Ozonesonde working group meeting, Juelich, Germany, February 2009.

Twenty Years of Ozonesonde Measurements above McMurdo Station, Antarctica (78 °S): Trends During Austral Spring. Deshler, T., J. L. Mercer, C. Kröger, B. Nardi, B. J. Johnson, Oral presentation, *Quadrennial Ozone Symposium*, Tromso, Norway, July 2008.

Signatures of transport into the tropical lower stratosphere. Is there supporting evidence for observations of anomalously high aerosol concentrations in the tropical lower stratosphere? Kovilakam M., J. Mercer, and T. Deshler, Oral presentation, *European Geophysical Union*, Vienna, Austria, April, 2008.

Atmospheric comparisons of electrochemical cell ozonesondes with different cathode solution strengths and from different manufacturers: A method to homogenize 0.5% and 1.0% KI measurements, T. Deshler and the BESOS team, Poster, *European Geophysical Union*, Vienna, Austria, April, 2008.

Large Particles in the Tropical Lower Stratosphere, In Situ Size Distributions, Oral presentation, *SCOUT O3 – AMMA Workshop*, Jülich, Germany, March 2007, T. Deshler and J. L. Mercer.

Large Particles in the Tropical Lower Stratosphere, In Situ Size Distributions, Oral presentation, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2006, T. Deshler and J. L. Mercer.

Retrieval of Aerosol Properties from Limb Scattering Measurements: Implications for OMPS, Oral presentation, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2006

Loughman R., Rault, D. F., Deshler, T.

Optical Properties of Mineral Dust Particles in a Small Urban Mid Continental Location, Poster, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2006, Eidhammer, T., Montague, D. C., Deshler, T.,

Use of 1.0% or 0.5% KI-buffered Cathode Solution in ECC Ozonesondes: An Analysis of Dual-Ozonesonde Flights Over McMurdo Station, Antarctica Through Comparison With Remote Measurements and a Transfer Function to Convert Between Solution Strengths, poster, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2006, Mercer, J. L., Deshler, T., Wood, S. W, Nichol, S.

- Twenty years of ozone profile measurements above McMurdo Station, Antarctica during austral spring, Poster at *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2005, J. Mercer, T., Deshler, C. Kröger, B. Nardi, and B. Johnson.
- Comparison of measured and modeled ozone above McMurdo Station, Antarctica, 1989-2003, during Austral winter/spring, Poster at *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2005, T. Deshler, J. L. Mercer, C. Kröger, B. Nardi, B. Johnson, M.P. Chipperfield, S.W. Wood, S.E. Nichol, and M.L. Santee
- Trends in Non-Volcanic Stratospheric Aerosol Determined from 30 Years of Aerosol Measurements by Lidar and Balloon-borne Particle Counters, *AGU spring meeting*, New Orleans, Amer. Geophys. Union, May 2005, T. Deshler, R. Anderson-Sprecher, H. Jäger, J. Barnes D. Hofmann, B. Clemesha D. Simonich.
- Trends in Non-Volcanic Stratospheric Aerosol Determined from 20 years of SAGE II Measurements, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 2004, T. Deshler, R. Anderson-Sprecher, P. Liu, T. Eidhammer, J. Yongxiao.
- Observations of large NAT particles in Arctic stratospheric clouds at the beginning of winter, *SOLVE2/VINTERSOL Workshop*. Orlando, Florida, October 2003, T. Deshler, J. Rosen, N. Larsen, C. Weisser, J. Schreiner, K. Mauersberger, F. Cairo, A. Adriani, G. di Donfrancesco, J. Ovarlez, and H. Ovarlez.
- Large nitric acid particles at the top of Arctic stratospheric clouds, Poster at *EGS/AGU Spring*, Nice, France, April 2003, (T. Deshler, J. Rosen, N. Larsen, C. Weisser, J. Schreiner, K. Mauersberger, F. Cairo, A. Adriani, G. di Donfrancesco, J. Ovarlez, and H. Ovarlez).
- Evaporation of polar stratospheric particles in situ in a heated inlet, Poster at *EGS/AGU Spring*, Nice, France, April 2003, (T. Eidhammer and T. Deshler).
- Stratospheric aerosol in the mid latitudes of both hemispheres: Balloonborne measurements of particle size distribution spanning 30 years in the north and 10 years in the south. Poster at *Chapman conference on Volcanism and the Earth's Atmosphere*, Santorini, Greece, June 2002. T. Deshler M. E. Hervig, J. M. Rosen, D. J. Hofmann, J. B. Liley.
- Vertical Profiles of Ozone at McMurdo Station, Antarctica, 78°S, 1986 - 2000, NDSC 2001 Symposium, Arcachon, France, September 2001, T. Deshler, C. Kröger, B. Nardi, B. J. Johnson, and D. J. Hofmann.
- Balloon-borne Measurements of Chemical, Physical, and Optical Properties of Polar Stratospheric Clouds. Part I: Instruments Flown on 25 January 2000, *SOLVE-THESEO 2000 science meeting*, Palermo, Italy, September 2000, A. Adriani, F. Cairo, F. Cardillo, G. Di Donfrancesco, R. Morbidini, M. Viterbini, J. Ovarlez and H. Ovarlez, T. Deshler, C. Kröger, J. Rosen, C. David and S. Bekki, K. Mauersberger, C. Voigt, A. Kohlmann, J. Schreiner, N. Larsen.
- Balloon-borne Measurements of Chemical, Physical, and Optical Properties of Polar Stratospheric Clouds. Part II: Particles near the Frost Point Temperature, *SOLVE-THESEO 2000 science meeting*, Palermo, Italy, September 2000, T. Deshler, C. Kröger, J. Rosen, C. Voigt, A. Kohlmann, J. Schreiner, K. Mauersberger, N. Larsen, J. Ovarlez, A. Adriani, F. Cairo, G. Di Donfrancesco, C. David and S. Bekki.
- Balloon-borne Measurements of Chemical, Physical, and Optical Properties of Polar Stratospheric Clouds. Part III: Particles at Temperatures near  $T_{\text{NAT}}$ , *SOLVE-THESEO 2000 science meeting*, Palermo, Italy, September 2000, C. Voigt, J. Schreiner, A. Kohlmann, K. Mauersberger, T. Deshler, C. Kröger, J. Rosen, N. Larsen, A. Adriani, G. Di Donfrancesco, F. Cairo, J. Orvalez and H. Orvalez, C. David and S. Bekki.
- In situ Measurements of ClO, BrO, CFC-11, Ozone, and Particles in the Arctic Polar Vortex: An Overview of the HALOZ 2000 Balloon Campaign, *SOLVE-THESEO 2000 science meeting*, Palermo, Italy, September 2000, D. Toohey, H. Vömel, T. Deshler, C. Kroger, N. Harris, A. Robinson, J. McIntyre, S. Kirkwood, S. Dagnesjö, H. Nilsson, L. Sarri.
- Analyses of balloon-borne tracer measurements made in the 1999/2000 winter, *SOLVE-THESEO 2000 science meeting*, Palermo, Italy, September 2000, Robinson, A, J. McIntyre, F. Danis, N.R.P. Harris, M. Guirlet1, J.A.Pyle1, J. Arvelius, H. Nilsson, S. Kirkwood, D. Toohey and T. Deshler.
- The Characterization of polar stratospheric clouds above Scandinavia by combining in situ and lidar measurements, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1997, T. Deshler, B. Nardi, A. Adriani, F. Cairo, G. Hansen, F. Fierli.



Estimating the composition of polar stratospheric clouds in the Antarctic using in situ aerosol measurements, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1997, C. Mitas and T. Deshler.

Comparison of in situ polar stratospheric aerosol measurements with ILAS extinction measurements on several occasions in the Arctic, *ILAS Correlative Measurement Meeting*, Paris, September, 1997, T. Deshler and M. Hervig.

Ozone lidar analysis technique: combining balloon data with lidar measurements, *13th ESA Symposium on European Rocket and Balloon Programmes and Related Research*, Oland, Sweden, May 1997, G. Hansen, U.-P. Hoppe, B. Nardi, T. Deshler.

Ten years of ozone and aerosol measurements from McMurdo Station, Antarctica, *NDSC Steering Committee Meeting*, Kona, Hawaii, November 1996.

The contribution of volcanic aerosol to Antarctic ozone loss during the years following Pinatubo, Relevance to mid latitudes, *Wyoming Space Grant Symposium*, Laramie, October, 1996.

Stratospheric aerosol observations in the mid latitudes and north polar regions and comparisons with satellite data. *ILAS planning meeting for correlative measurements*, Paris, France, October, 1996.

The measurement of optical scattering from polar stratospheric cloud particles at two angles: inferences concerning particle index of refraction, Poster at the *XVIII Quadrennial ozone symposium*, L'Aquila, Italy, September 1996.

Vertical profiles of cloud condensation nuclei from a balloon-borne instrument, *Fourteenth international conference on nucleation and atmospheric aerosols*, Helsinki, (preprints pp. 911-914) August 1996 (P. Wechsler, G. Vali, J. R. Snider, and T. Deshler).

An overview of measurements of polar stratospheric clouds, ozone loss, and volcanic aerosol from McMurdo, *Antarctic Experimenter's Meeting*, National Science Foundation, Arlington, Virginia, April, 1996.

Moderation of Antarctic ozone depletion due to decreasing levels of Pinatubo aerosol, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1995, Deshler, T.

Vertical profiles of cloud condensation nuclei, optical aerosol, aerosol optical properties, and aerosol volatility measured from balloons, *Aerosol interdisciplinary program workshop*, Columbia, Maryland, October 1995, Deshler, T., J. R. Snider, G. Vali.

Vertical profiles of volcanic aerosol and polar stratospheric clouds above Kiruna, Sweden, Winter 1995, Poster presentation, *Third European symposium on polar stratospheric ozone*, Schliersee, Germany, September, 1995, Deshler, T.

Lidar and particle counter measurements in polar stratospheric clouds and volcanic aerosol over McMurdo Station, Antarctica (78 S) during spring 1992, Poster presentation, *International conference on ozone in the lower stratosphere*, Hakidiki, Greece, May 1995, Deshler, T., A. Adriani.

Particle counter measurements in polar stratospheric clouds over McMurdo Station, Antarctica (78 S) during winter 1994, *EGS spring meeting*, Hamburg, Germany, European Geophys. Union, April 1995, Deshler, T., S. Wood, H. Vömel.

Particle counter measurements in polar stratospheric clouds over McMurdo Station, Antarctica (78 S) during winter 1994, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1994, Deshler, T., S. Wood, H. Vömel.

Lidar and particle counter measurements in polar stratospheric clouds and volcanic aerosol over McMurdo Station, Antarctica (78 S) during spring 1992, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1994, Adriani, A., T. Deshler, G. Di Donfrancesco.

Stratospheric ozone and aerosol profiles at a remote continental site in the American west, *74th Annual Meeting American Meteorological Society*, Nashville, Tennessee, January 1994, Deshler, T.

Comparisons of ozone and aerosol profile measurements at Laramie, Wyoming, during the winters and springs before and after the Pinatubo eruption. *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1993, Deshler, T.

McMurdo ozonesonde measurements since 1986. Ozonesonde data workshop, Boulder, Colorado, October 1993, Deshler, T.

Polar stratospheric clouds and volcanic aerosol over McMurdo Station, Antarctica, the spring of 1992, poster presentation, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1993, Deshler, T., B. J. Johnson, and W. R. Rozier.

Ozone profiles at McMurdo Station, Antarctica, during the austral spring of 1992., poster presentation, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1993, Johnson, B. J., T. Deshler, and W. R. Rozier.

Balloonborne Measurements of Pinatubo Aerosol During 1991 and 1992 at Several Locations, Vertical Profiles, Size Distribution, and Volatility. *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1992, Deshler, T., B. J. Johnson, and W. R. Rozier, D. J. Hofmann.

Balloonborne Measurements of Pinatubo Aerosol During 1991 and 1992 at Several Locations, Vertical Profiles, Size Distribution, and Volatility. *Eleventh Annual Meeting, American Association for Aerosol Research*, San Francisco, October 1992, Deshler, T., B. J. Johnson, and W. R. Rozier.

Measurements of unusual aerosol layers in the upper troposphere over Laramie, Wyoming in the spring of 1991: Evidence for long range transport from the oil fires in Kuwait. *Eleventh Annual Meeting AMS*, San Francisco, American Association for Aerosol Research, October 1992, Deshler, T.

In situ measurements of the size distribution of the Pinatubo aerosol over Kiruna on 4 days between 18 January and 13 February 1992. Poster presentation at Second European *Symposium on Polar Stratospheric Ozone*, Schliersee, Germany, October 1992, Deshler, T.

The lifetime of leewave - induced ice particle in the Arctic stratosphere: I Balloonborne measurements. Poster presentation at Second European *Symposium on Polar Stratospheric Ozone*, Schliersee, Germany, October 1992, Deshler, T.

Vertical profiles of ozone and temperature over McMurdo Station, Antarctica: Comparison of austral spring monthly averages 1986 to 1991. *1992 Quadrennial Ozone Symposium*, Charlottesville, June 1992, Deshler, T., B. J. Johnson, and D. J. Hofmann.

Vertical profiles of CN and aerosol over Kiruna, 18 January - 13 February, 1992. EASOE post mission meeting, L'Aquila, Italy, May 1992, Deshler, T.

Observations of volcanic aerosol between 10 and 13 km within the Antarctic polar vortex during austral spring 1991, *AGU spring meeting*, Montreal, Amer. Geophys. Union, May 1992, Deshler, T., B. J. Johnson, A. Adriani, G. P. Gobbi, D. J. Hofmann, and S. J. Oltmans.

Observations of polar stratospheric clouds during spring 1991 at McMurdo Station, Antarctica, *AGU spring meeting*, Montreal, Amer. Geophys. Union, May 1992, Adriani, A., G. P. Gobbi, T. Deshler, B. J. Johnson, and G. Di Donfrancesco .

Vertical profiles of ozone at McMurdo Station, Antarctica; Spring 1991, *AGU spring meeting*, Montreal, Amer. Geophys. Union, May 1992, Johnson, B. J., T. Deshler, and R. A. Thompson.

Measurements at Laramie, Wyoming, of aerosol from the oil fires in Kuwait, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1991, Deshler, T., and D. J. Hofmann.

Balloonborne measurements of the Pinatubo aerosol, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1991, Hofmann, D. J., T. Deshler, B. J. Johnson, and W. R. Rozier.

Correlative measurements of stratospheric ozone, aerosol, and water vapor following the eruption of Pinatubo, *AGU fall meeting*, San Francisco, Amer. Geophys. Union, December 1991, Oltmans, S. J., D. J. Hofmann, T. E. DeFoor, M. J. Post, C. J. Grund, and T. Deshler.

Measurements of the polar stratospheric cloud size distribution in the Arctic and effects on ozone measurements, International Union of Geodesy and Geophysics, Vienna, Amer. Geophys. Union, - August 1991, Hofmann, D. J., and T. Deshler.

Balloonborne stratospheric ozone and water vapor profile measurements in the Antarctic, International Union of Geodesy and Geophysics, Vienna, Amer. Geophys. Union, August 1991, Oltmans, S. J., D. J. Hofmann, and T. Deshler.

Ozone profiles at McMurdo Station, Antarctica, the austral spring of 1990, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1991, Deshler, T., and D. J. Hofmann.

Evidence of denitrification in the 1990 Antarctic spring stratosphere, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1991, Gobbi, G. P., A. Adriani, T. Deshler, and D. J. Hofmann.

Ozone and temperature profiles over McMurdo Station, Antarctica, (78°S) in September - October 1989, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1990, Deshler, T., and D. J. Hofmann.

Ozone and temperature profiles over Kiruna, Sweden, (68°N) in January - February 1990, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1990, Hofmann, D. J., and T. Deshler.,

Ozone measurements within, on the edge, and outside of the Antarctic polar vortex in the spring of 1988, *AGU spring meeting*, Baltimore, Amer. Geophys. Union, May 1989, Deshler, T., and D. J. Hofmann.

- A comparison of the Antarctic springtime ozone over McMurdo (78°S) in 1986, 1987, and 1988, AGU 1989 spring meeting, Baltimore, Amer. Geophys. Union, May 1989, Hofmann, D. J., and T. Deshler.
- The evolution of artificially nucleated ice crystals in shallow orographic winter clouds: Two case studies, *Eleventh Conference on Weather Modification*, Edmonton, Amer. Meteor. Soc., October 1987, Deshler, T., and D. W. Reynolds.
- Observations of snow crystal concentration, habit, riming, and aggregation, collected at the surface during six fog seeding experiments. *Eleventh Conference on Weather Modification*, Edmonton, Amer. Meteor. Soc., October 1987, Deshler, T., D. W. Reynolds, and J. H. Humphries.
- A comparison of snowfall characteristics from winter storms over coastal and inland mountain barriers, *Twenty Third Conference on Radar Meteorology and Conference on Cloud Physics*, Snowmass, Amer. Meteor. Soc., September 1986, Deshler, T., R. M. Rauber, and J. H. Humphries.
- Snow crystal concentrations and size distributions measured at the ground: A comparison of an aspirated 2D-C with other techniques, *Tenth Conference on Weather Modification*, Arlington, Amer. Meteor. Soc., May 1986, T. Deshler, D. W. Reynolds, and G. L. Gordon.
- Concentrations of ice nuclei of different modes of activation, *Eleventh International Conference on Atmospheric Aerosols, Condensation and Ice Nuclei*, Budapest, International Association of Meteorology and Atmospheric Physics, September 1984, Vali, G., T. Deshler, and D. C. Rogers.
- A three dimensional computer model to aid in selecting monitor locations in the Vadose zone, Conference on Characterization and Monitoring of the Vadose Zone, Las Vegas, *National Water Well Association and Environmental Protection Agency*, December 1983, McKee, C. R., A. C. Bumb, and T. Deshler.
- Contact ice nucleation by submicron atmospheric aerosols, *Conference of Cloud Physics*, Chicago, Amer. Meteor. Soc., November 1982. T. Deshler.
- Ice crystal and ice nucleus measurements in cap clouds, *Conference of Cloud Physics*, Chicago, Amer. Meteor. Soc., November 1982, Vali, G., D. C. Rogers, and T. Deshler.

#### OTHER PUBLICATIONS

- Deshler, T., Clouds in the Arctic stratosphere catalyze ozone loss, *Witness the Arctic, Chronicles of the NSF Arctic sciences program*, 8, 14, Winter 2000/2001.
- Nardi, B., and T. Deshler, Spring 1998 ozonesonde measurements over McMurdo Station, Antarctica, *Antarctic Journal of the United States*, 1998 review issue.
- Deshler, T., B. Nardi, D. J. Hofmann, and B. J. Johnson, Correlations between ozone loss and volcanic aerosol at altitudes below 14 km over McMurdo Station, Antarctica, *Antarctic Journal of the United States*, 1996 review issue.
- Deshler, T., and A. Adriani, Volcanic aerosol and ozone depletion within the Antarctic polar vortex during the austral spring of 1991, *Antarctic Journal of the United States*, 27, 1992 review issue.
- Deshler, T., Ozone depletion and denitrification in the Antarctic stratosphere in austral spring 1990, *Antarctic Journal of the United States*, 26, 1991 review issue.
- Westerskov, Kim, The witches' cauldron, *New Zealand Geographic*, 9, 84-92, 1991. (T. Deshler extensively interviewed for this article which won the "Science Journalism Award" from the New Zealand association of scientists)
- Deshler, T., D. J. Hofmann, J. V. Hereford, and C. B. Sutter, Vertical profiles of ozone and aerosol at McMurdo Station, Antarctica, in the spring of 1989, *Antarctic Journal of the United States*, 25, 1990 review issue.
- Deshler, T., D.J. Hofmann, and J.V. Hereford, Vertical profiles of ozone and aerosol within, on the edge, and outside of the Antarctic polar vortex in the spring of 1988, *Antarctic Journal of the United States*, 24, 1989 review issue.
- Deshler, T. L., Contact ice nucleation by submicron atmospheric aerosols, Ph.D. dissertation, University of Wyoming, 128 pp., May 1982.
- Deshler, T. L., Inferences on hail growth from freezing nucleus analyses of accreted ice, M. S. thesis, University of Wyoming, 65 pp, May 1975.

#### PROFESSIONAL CONTRIBUTIONS AND UNIVERSITY SERVICE

##### Graduate students directed:

**Ph.D. Completed (5):**

Patrick Campbell (August 2013) PhD, Atmospheric Science, The Climatology, Extent, and Impact of Stratospheric Condensation Nuclei, including their formation in polar regions. Begun Fall 2008.  
Mahesh Kovilakam (August 2012) PhD, Atmospheric Science, On the accuracy of stratospheric aerosol extinction and surface area derived from in situ and remote measurements. Begun Fall 2006.  
Trude Eidhammer (December 2006) PhD, Atmospheric Science, Determining particle index of refraction with measurements of scattering at two angles. Begun April, 2001  
David Delene (December 1998) PhD, Atmospheric Science, Vertical profiles of cloud condensation nuclei at a mid continental site through the development and use of a balloon-borne instrument.  
Mark Hervig (May 1997) PhD, Atmospheric Science, The physical properties of stratospheric aerosols determined from HALOE observations.

**M.S. Completed (14):**

Jaclyn M. Ritzman, (December 2013) MS, Estimates of the fraction of precipitation seedable under application of the Wyoming Weather Modification Pilot Project seeding criteria, University of Wyoming, 96 pp. Begun Fall 2011.  
Shauna Ward (May 2013) MS, Atmospheric Science, An Analysis of Polar Stratospheric Clouds on Quasi-Lagrangian Surfaces: Particle Formation and Properties. Begun Fall 2010.  
Stephanie Luberda (August 2010), MS, Atmospheric Science, Investigations of causes of the variability in austral polar ozone loss in the last decade. Begun Fall 2008  
Leslie Baran (Dec. 2009), MS, Atmospheric Science, Determination of the stoichiometric ratio of iodine to ozone in typical ozonesonde cathode electrolytes. Begun Fall 2006,  
Andrew Glen, (August 2007) MS, Atmospheric Science, A new optical particle counter for in situ measurements of stratospheric aerosol size distributions. Begun Fall 2004.  
Jian Yongxiao, MS, Atmospheric Science, December 2004, Retrieval of aerosol surface area from SAGE II extinction measurements.  
Sharon Gill, MS, Atmospheric Science, August 2001, In situ and satellite comparisons of stratospheric ozone data. Co-chairman with Derek Montague.  
Qun Miao, MS, Atmospheric Science, May 2001, An evaluation of errors associated with the measurement of aerosol concentration in situ with optical particle counters.  
Chuntao Liu, MS, Atmospheric Science, December 2000, Detection of polar stratospheric clouds using HALOE data, Co-Chairman with Mark Hervig  
Willard R. Bellon, MS, Atmospheric Science, December 1998, Inference on the development of polar stratospheric clouds in the Antarctic through trajectory studies.  
Christos M. Mitas, MS, Atmospheric Science, August 1997, Estimating the composition of polar stratospheric clouds in the Antarctic using in situ aerosol measurements.  
Rigeto Zhao, MS, Atmospheric Science, December 1995, Laboratory measurements of the response of optical particle counters to particles of different shape and refractive index.  
Dongliang Wang, MS, Atmospheric Science, December 1993, Stratospheric aerosol refractive index determined by comparison of backscattering calculated from aerosol size distribution measurements.  
William R. Rozier, MS, Atmospheric Science, December 1993, Analysis of a balloonborne, continuous flow condensation nuclei growth chamber.

Additional students supported financially: Wenfang Lei, MS, Atmospheric Science, May 1998, Aerosol scattering extinction obtained from a balloon-borne measurement platform.

Incompletes (8): PhD: *Katie Foster begun - Fall 2013* Mark Weitz, W. Miyakawa, D. Fitzgerald, MS: Lauren Ownby, Eric Hoen, Jim Hereford, Rebecca Larsen,

**Post Doctoral Scholars (4):**

Jennifer Mercer (2003-2005, promoted to staff scientist 2006-2009, then to Cold Regions Engineering Laboratory, US Army, now at NSF.  
Chris Kröger (1999-2002, in NZ?)  
Bruno Nardi (1995-1999, in Denver, real estate agent)

Bryan Johnson (1991-1994, at NOAA, Boulder, Colorado)

**Thesis committee service:**

**External Examiner:**

Thomas Chambers, PhD, Physical Sciences, University of Adelaide, Adelaide, Australia, April 2022  
Andolsa Arevalo Torres, PhD, Physics, University of Canterbury, Christchurch, NZ, April/May 2012  
Gareth Thomas, PhD, Physics, University of Canterbury, Christchurch, NZ, August 2003

**University of Wyoming:**

Eric Beamsderfer, MS, Atmospheric Science, 2013  
Dustin Snare, MS, Atmospheric Science, March 2013  
Rudra Pokhrel, MS, Atmospheric Science, January 2015  
Adam Wettlaufer, MS, Atmospheric Science, May 2014  
Binod Pokharel, PhD, Atmospheric Science, December 2014  
Nicole Flynn, MS, Education, pending  
Damao Zhang, PhD, Atmospheric Science, 2008, December 2012  
Wiesje Mooiwer, MS, Atmospheric Science, December 2008  
Mariya M. Shcherbyna, MS, Atmospheric Science, August 2006.  
Benjamin Sipprell, MS, Atmospheric Science, December 2005.  
Kelly Page, PhD, Physics and Astronomy, May 2005.  
Chuntao Liu, PhD, Atmospheric Science, July 2003  
Hiroshi Takagi, MS, Atmospheric Science, July 2003  
Shawn Palmer, MS, Chemistry, August 2002  
Ziguang Han, MS, Atmospheric Science, August 1999.  
David Cissell, MS, Atmospheric Science, October 1998.  
Wenfang Lee, MS, Atmospheric Science, May 1998  
Adam Whitten, PhD, Physics and Astronomy, September 1996.  
Dongliang Wang, MS, Computer Science, Summer 1995.  
Mary Walsh, MS, Atmospheric Science, Summer 1995.  
Dongbin Fan, MS, Atmospheric Science, December 1993  
Juhang Wang, MS, Atmospheric Science, Summer 1992  
Jiefei Jia, MS, Atmospheric Science, Fall 1991

**Lay presentations:**

2015: Remember the ozone hole? Fort Collins public library, 21 October, 2015.  
2012: March, judge – Wyoming State Science Fair,  
2011: Balloon flight including ptu, ozonesonde, camera –Theresa Williams 6-7 graders Albany County Lab school, May 13. Voice of America radio interview commenting on Solomon et al. (2011) ‘The Persistently Variable “Background” Stratospheric Aerosol Layer and Global Climate Change’, *Science*, 333, 866-860.  
2010: Science fair judge (3/8), September: McMurdo science lecture: Polar Stratospheric Clouds – What are they? Why are they colored? Why do we care? and October: Polar Stratosphere – Climate, Chemistry, and Clouds  
2009: September: McMurdo science lecture: The polar regions - an atmospheric optical paradise, or what causes the color in nacreous clouds, and what do they have to do with ozone?  
2008: April – Stratospheric research presented to Phi Kappa Phi initiation ceremony.  
2007: 5 March, judge – Wyoming State Science Fair. 3 October - Stratospheric research presented to breakfast Rotary club, 30 October – “Magic of Dust” Laramie Lyceum.  
2006: Discussion on ozone and global warming with Sarah Fuller’s 6<sup>th</sup> grade class in Cheyenne (Dec 19), Spring Creek Elementary School science fair judge (Feb 9)  
2005: Presentation on ozone and polar ozone loss to breakfast Rotary club (Jan. 19), Spring Creek Elementary School science fair judge (Feb 9) Presidential speaker series: "The magic of dust" given in Laramie (April 11), Casper (April 18), and Laramie (October 24). Presentation to lunchtime Rotary club on Atmospheric Science - open questions (July 13). The witches cauldron and ozone loss, *Science*

lecture given to McMurdo Station community jointly with Albert and Philippe Cocquerrez for CNES (Sept.)

2004: Presentation to the International Engineers Club, University of Wyoming, on - Stratospheric Research: University of Wyoming, November 18, 2004.

2003: Antarctic ozone loss: A review and plans for Winter 2003, Science lecture given to community at McMurdo Station, Antarctica (Feb). Polar ozone loss - Science lecture to community at McMurdo Station (Twice, Sept. and Oct.).

2002 Presentation on Antarctica to Mrs. Swanson's 1<sup>st</sup> grade class, Prep (Jan).

2000 Presentation to Engineering College Advisory Board on aerosol research at University of Wyoming (May)

1999 Invited lectures on ozone depletion and global climate change for FCSC 4182/5182, Textile industry and the environment, D. M. Brown and S. S. Meyer, and on ozone depletion for CHE 2000, Facts of environment, M. P. Sharma. Presentation on ozone depletion to Sara Fuller's 8<sup>th</sup> grade class in Walden, CO. Channel 9 news feature on scientific ballooning from Laramie. Presentation on "Why the wind blows" Kathy McAtee's 5<sup>th</sup> grade class, Elk Mountain, WY

1998 Presentations to Mr. Abelson's three classes of high school chemistry regarding the research done by my group. Featured speaker at a dinner honoring participants in the Wyoming 1998 MathCounts.

1997 Radio interview, insight, on ozone depletion (April), KUWR, Radio interview K-TWO, (October)

1996 Radio interview on CFC regulations, Jim Kearns, (January); Talk on ozone depletion to 4-5th grade W TCL-L (May). Lecture on the relationship of science and religion, a scientist's view for RELI 4500, S. Palmer, (June).

1995 Invited lecture on ozone depletion for PETE 2000, Facts and fictions of environmental crisis, M. P. Sharma (November); Television interview Ch. 5 news, KSL, Salt Lake City UT (November). Slide show on Antarctica to Kindergarten WTCL-L (October).

1994 Lay talks on ozone depletion: Compressed video course on climate change for high school teachers, (June); Course on Facts and fictions of environmental crisis in Chemical and Petroleum Engineering Dept, (June); Course on climate change and biodiversity, Teton Science School, Jackson (August); Opening science talk, McMurdo Station, Antarctica, (Sept); Rotary club Casper (Dec).

1993 Lay talks on ozone depletion: National Merit symposium University of Wyoming (Sept); Cheyenne leadership conference (Sept); College of Engineering seminar during homecoming (Oct).

1992 Talks on ozone depletion to the following groups: Economics and Energy class taught by G. Harris (spring 1992); Engineering Summer Program class for high school students taught by M. Whelan (2 classes, summer 1992); High School Teachers Engineering Program class taught by M. Whelan (summer 1992); Southeast Wyoming Chapter of Amer. Meteor. Soc. (October 1992); ES1000 class taught by G. Harris (December 1992).

Cloud workshop presented at the Wyoming Children's Museum and Nature Center(November 1992).

Radio interviews 1992 with: KUWR Insight about ozone depletion in the Arctic and due to the Pinatubo eruption (April 1992); Voice of America concerning Kuwaiti aerosol (May 1992); and with KOWB concerning global cooling due to Pinatubo aerosol (May 1992).

### **Proposal Reviews:**

2022: British National Environment Research Council Fellow (1), British NERC(1), NASA post doc(1)

2021:

2020: NSF(2), DOE-SBIR(1), NSF-SBIR\_RevPanel(4)

2019: NSF(1), Italian Antarctic Program(1), DOE-SBIR(1), Discovery Grants Canada(1)

2018: NSF(1), DOE-SBIR (1), OARU (1)

2017: DOE-SBIR(1), NZ Antarctic Program(1)

2016: NSF(1), DOE-SBIR (3), Italian Antarctic Program (PNRA) (2), British-NERC(1), Indian-TIFR(1)

2015: NSF(1), Austrian Science Fund (1), DOE (1), DOE-SBIR (4) Global center for food systems innovation (1)

2014: NSF(3), Austrian Science fund (1), NZAntarcticProgram (2), DOE-SBIR (6), NASA post doc (3), Ralph E. Powe junior faculty award (1), CNES-France (1).

2013: NSF (1), NASA Review panel Aura science team (lead-2, secondary-4), NSF Review panel Antarctic proposals (lead-6, read-5, scribe-4), DOE-SBIR(3).

2012: NSF (2), SBIR (4), NASA Post Doc (1), UW School of Energy Resources (2)

2011: NSF (3), DOE-SBIR (1), Austrian Science Fund final report review (1), National Environment Research Council, United Kingdom (1), NSF Review panel Science and Technology Centers (lead-2, scribe-1, panelist-7)

2010: NSF(2), NSF Review panel Deep convective clouds (lead-1, reader-4, panelist-11), British National Environment Research Council (2), NASA post doc applications (6), Austrian Science Fund (1)

2009 : NSF(2), NASA Post Doc applications (3), Academy of Finland (2), Israeli Science Foundation (1), Marsden fund New Zealand (1), British National Environment Research Council (1)

2008: NSF (2), NASA (1), NASA Post Doc applications (3), Austrian Science Fund (2),

2007: NSF(2), Austrian Science Fund (2)

2006: NSF(2), US Civilian Research & Development Foundatoin (1)

2005: NSF(1),National Environment Research Council, United Kingdom (3)

2004: NSF(2),National Environment Research Council, United Kingdom (1)

2003: NSF(4), NOAA(2), National Environment Research Council, United Kingdom (1)

2002: NSF(2), NASA(3), National Environment Research Council, United Kingdom (2), Consiglio Nazionale delle Ricerche, Italy (3), International Science and Technology Center, Russia (1)

2001: NSF(3), NASA(2), National Environment Research Council, United Kingdom (4), International Science and Technology Center, Russia (1)

2000: NSF(1), NASA(1), National Environment Research Council, United Kingdom (1), Consiglio Nazionale delle Ricerche, Italy (3)

1999: NSF (1), NASDA Japan (2)

1998: NSF (1), New Zealand Foundation for Research, Science, and Technology (1), NSF Review panel Knowledge and Distributed Intelligence (reviewer-13, discussant-25)

1997: NSF (1), NASA (1)

1996: New Zealand Foundation for Research, Science, and Technology (1)

1995: NSF (2), NASA (2), New Zealand Foundation for Research, Science, and Technology (6)

1994: NSF (3), NASA (6), NOAA (1)

1993: NSF (1), NOAA (1)

1992: NASA (3)

1991: NSF (2), NASA (2)

### **Manuscript Reviews:**

2022: Env. Res. Lett. (2), J. Quant. Spectroscopy and Radiative Transfer (1), Remote Sensing (1), Atmosphere (1), Atmos. Chem. Phys. (1), Atmos. Res. (1), Proc. Nat. Acad. Sci. (1)

2021: Atmos. Meas. Tech.(2), Atmos. Res. (1), J. Geophys. Res.(1), Env. Res. Lett. (1)

2020: Atmos. Meas. Tech. (1), Adv. Space Res. (1), Rev. Geophys. (1), npj Clim. and Atmos. Sci. (3), J. Geophys. Res. (1), Atmos. Res. (1), Bldg&Environ. (1)

2019: Advances in Space Research(1), Atmos. Chem. Phys.(3), Can. J. Remote Sensing (2), Nature (2), Atmos. Meas. Tech.(1), Gephys. Res. Lett.(2), Frontiers of Optoelectronics(1)

2018: J. Geophys. Res. (2), Geophys. Res. Lett. (2), Atmos. Meas. Tech. (1), Atmos. Chem. Phys. (2), J. Aerosol Sci. (1), Sci. World J. (1).

2017: J. Geophys. Res. 1), Geophys. Res. Lett. (2), Atmos. Chem. Phys. (1), Environmental Res. Lett. (2), Promotion and Tenure reviews (1), WWMPP Ch. 7 and Exec. Summary.

2016: J. Geophys. Res. (2), Geophys. Res. Lett. (1), Atmos. Meas. Tech. (2), Science (1), Atmos. Chem. Phys. (5). J. Basic Applied Science (1). WWDO-Feasibility Reports (2), Promotion and Tenure reviews (2).

2015: J. Geophys. Res. (2), Environ. Res. Letters (1), Atmos. Meas. Tech. (2), Aerosol Sci. Tech. (1), Aerosol and Air Quality Res. (1), Austrian Science Fund final report (1), COMNAP Antarctic Research Challenges (ARC) Project Writing Group Report (1).

2014: J. Geophys. Res. (1), Atmos. Chem. Phys. (2), Atmos. Meas. Tech. (2), Environ. Res. Lett. (1)

2013: J. Geophys. Res. (1), Atmos. Chem. Phys. (2), Atmos. Meas. Tech. (3), J. Atmos. Chem. (1), Environ. Res. Lett. (3), Atmosphere-Ocean (1), Book proposal review Volcanism & Global Environmental Change, Cambridge Univ. press

2012: J. Geophys. Res. (2). Geophys. Res. Lett. (1), Atmos. Chem. Phys. (2), Atmos. Meas. Tech. (1), J. Atmos. Chem. (1)

2011: J. Geophys. Res. (5), Geophys. Res. Lett. (2), Atmos. Chem. Phys. (3), J. Atmos. Chem. (1), Polar Research (1), Outside letter P&T University of Oxford.

2010: J. Geophys. Res. (8), Geophys. Res. Lett. (1), Atmos. Res. (1), SOLA (1), Proc Royal Soc. (1)

2009: Geophys. Res. Lett. (1), J. Geophys. Res. (4), Atmos. Meas. Technol. (1), Nature (1), Outside letter P&T University of Colorado.

2008: J. Geophys. Res. (7), Atmos Chem Phys (1), Environ. Sci. Technol. (1), Atmos. Meas. Technol. (1), Outside letter P&T Utah State University.

2007: J. Geophys. Res. (5), Science (1)

2006: Geophys. Res. Lett (2), J. Geophys. Res. (5), Science (1), SOLA-electronic journal of the Meteor. Soc. Japan (1), Annales Geophysicae (1), Proceedings of National Academy of Science (1) Seeding Feasibility Study for Salt River and Wyoming Range, commissioned by Wyoming Water Development Commission,

2005: Geophys. Res. Lett (1), J. Physical Chemistry (1), J. Geophys. Res. (2), Atmospheric Research (1), Atmospheric Chemistry and Physics (1), SOLA-electronic journal of the Meteor. Soc. Japan (1), Book proposal on atmospheric remote sensing for Taylor & Francis Inc (1), Review article for Advances in Space Research (1)

2004: Geophys. Res. Lett (1), J. Geophys. Res. (3), Science (1), Physical Geography (1), IPCC report proposal for Cambridge University Press.

2003: J. Geophys. Res. (6), Atmospheric Research (1), Review of a book proposal for Cambridge University Press.

2002: Geophys. Res. Lett (1), J. Geophys. Res. (2), Atmospheric Environment (1), Atmospheric Chemistry and Physics (1), Chapman conference monograph on *Volcanism and the Earth's Atmosphere*, chapter on Aerosol chemistry interactions after the Mt. Pinatubo eruption

2001: Geophys. Res. Lett (4), J. Geophys. Res. (5), Atmospheric Environment (1), J. Atmos. Sci. (1), J. Atmospheric and Solar-Terrestrial Physics (1), J. Atmos. Oceanic Tech. (1), *European Research in the stratosphere 1996-2000: Advances in our understanding of the ozone layer during THESEO*, 2001, European Commission, Directorate General for Research. (external reviewer of Polar Ozone Chapter)

2000: Geophys. Res. Lett (1), J. Geophys. Res. (4), J. Aerosol Sci. (1), J. Atmospheric and Solar-Terrestrial Physics (1)

1999: Geophys. Res. Lett (3), J. Geophys. Res. (2), J. Appl. Meteor. (1), J. Physical Chemistry (1), Annales Geophysicae (1)

1998: Geophys. Res. Lett (3), J. Geophys. Res. (2), J. Atmos. Oceanic Tech. (1), Annales Geophysicae (1)

1997: J. Geophys. Res. (1), J. Meteor. Soc. Japan (1), J. Atmos. Oceanic Tech. (1), Prospective book for Kluwer Academic

1996: Geophys. Res. Lett. (2), J. Geophys. Res. (4), J. Atmos. Chem. (1), Annales Geophysicae (1)

1995: Geophys. Res. Lett. (5), J. Geophys. Res. (3)

1994: Geophys. Res. Lett. (2), J. Geophys. Res. (1)

1993: Geophys. Res. Lett. (3), J. Geophys. Res. (2)

1992: Geophys. Res. Lett. (3), J. Geophys. Res. (2)

1991: Geophys. Res. Lett. (1), J. Appl. Meteor. (1), J. Atmos. Oceanic Technol. (1)

1990: J. Appl. Meteor. (1)

#### **Committee Service:**

##### **National/International:**

Co-convener Chapman conference on Stratospheric aerosol in the post-Pinatubo era, March 2017.

Member scientific steering committee for the SPARC activities:

Polar stratospheric clouds, 2014-2019

SSiRC (Stratospheric sulfur and its role in climate), 2012-present.

US representative on the physical sciences standing scientific group for the Scientific Committee on Antarctic Research (SCAR), April 2010 - 2016

University trustee on the Weather Modification Association board, April 2008 – April 2011

Network for the Detection of Atmospheric Composition Change: Co-chair of the Ozone and Aerosol Sonde Working Group, 1998 – 2009



National Science Foundation: Organizing committee to prepare the report: [\*Setting a Course for Antarctic Integrated System Science\*](#), based on a workshop organized in June 2006 in Arlington, Virginia.

National Academy of Sciences: Review Panel for the: [\*Review of the U.S. Climate Change Science Program's Draft Synthesis and Assessment Product 2.4: Trends in Emissions of Ozone Depleting Substances, Ozone Layer Recovery, and Implications for Ultraviolet Radiation Exposure \(2007\)\*](#)

McMurdo Area User's Committee for the National Science Foundation, 1996 – 2003.

**University/State:**

2005- 2015: University representative on the state Technical Advisory Team for the Wyoming Weather Modification Pilot Program.

2006: Search committee: Director of the Science Mathematics Teaching Center, College of Education.

2005: Search committee for the Cline chair, College of Engineering.

2003 – 2005, Chairman 2005: Promotion and Tenure committee, University of Wyoming.

2000 - 2002, Chairman 2002: Promotion and Tenure committee, College of Engineering.

**Department:**

Fall 2010 – Fall 2013 : Graduate student coordinator

June 2013: Chair search committee Associate Research Scientist

Sept 2011 – Feb 2012: Search committee Wyoming excellence chair in Regional Climate Modeling.

Sept 2010 – March 2011: Search committee Wyoming excellence chair Atmosphere/Biosphere Interactions.

Fall 2007- Spring 2010: Faculty Senate representative.

Dec 2008 – Jan 2009: Chair of committee for 5 year review of Head of the Department of Atmospheric Science and Flight Facility Manager of the D. L. Veal Research Flight Center.

2008: Chair of committee for preparation of qualifying assessment for four PhD students.

Sept 2008 – Jan 2009: Search committee Wyoming excellence chair Atmosphere/Biosphere Interactions.

Sept 2007 – April 2008: Search committee for Wyoming excellence chair in Climate and Ecology.

**COURSES TAUGHT**

2017 Summer - Engineering Summer Program (ESP), 1 week class for 10 high school students.

2016 Summer - Engineering Summer Program (ESP), 1 week class for 10 high school students.

2015 Summer - Engineering Summer Program (ESP), 1 week class for 12 high school students.

2014 Summer - Engineering Summer Program (ESP), 1 week class for 12 high school students.

2014 Spring, (ATSC 5880) Topics in aerosol physics, 3 hours, 4 students.

2013 Fall (ATSC4400/5400) The physical basis of climate (3 h, 6 students), (ATSC 5002) Atmospheric Radiation, 3 hours, 6 students, (ATSC 5003) Problems in energetics and radiation, 1 hour (team taught), 6 students.

2013 Summer - Engineering Summer Program (ESP), 1 week class for 12 high school students.

2012 Fall (ATSC 5002) Atmospheric Radiation, 3 hours, 7 students. (ATSC 5003) Problems in energetics and radiation, 1 hour (team taught), 7 students,

2012 Summer – Engineering Summer Program (ESP), 1 week class for 12 high school students.

2011 Fall (ATSC 5002) Atmospheric Radiation, 3 hours, 7 students, (ATSC 5003) Problems in energetics and radiation, 1 hour (team taught), 7 students, (ATSC 5880) Topics in aerosol physics, 3 hours, 2 students

2011 Spring (ATSC4400/5400) The physical basis of climate (3 h, 12 students), (ATSC 2000) Introduction to Meteorology (3 h, 33 students).

2010 Spring ATSC 5880 offered but only one student. Fall – field work Antarctica

2009 Spring – sabbatical, Fall – field work Antarctica

2008 Fall (ATSC 5002) Atmospheric Radiation, 3 hours, 4 students, (ATSC 5003) Problems in energetics and radiation, 1 hour (team taught), 4 students

2008 Spring (ATSC 5880) Topics in aerosol physics, 3 hours, 8 students

2007 Fall (ATSC 5002) Atmospheric Radiation, 3 hours, 5 students, (ATSC 5003) Problems in energetics and radiation, 1 hour (team taught), 5 students

2007 Summer: (NASC5120) Earth Science in Global Context – Science and Mathematics Teaching Center, 3 hours (team taught), 17 students  
 2006 Fall (ATSC 5002) Atmospheric Radiation, 3 hours, 6 students, (ATSC 5003) Problems in energetics and radiation, 1 hour (team taught), 6 students  
 2006 Spring: (ATSC 2000) Introduction to Meteorology, 3 hours, 21 students  
 2005 Spring: (ATSC 2000) Introduction to Meteorology, 3 hours, 11 students  
 2005 Spring: (ES2101) Statics, 3 hours, 19 students  
 2004 Summer: (NASC5120) Earth Science in Global Context – Science and Mathematics Teaching Center, 3 hours (team taught), 15 Students  
 2004 Spring: (ATSC 5500) Atmospheric Radiation and Optics, 3 hours, 3 students  
 2002 Fall: (HP4152) Senior Honors Seminar on Global Environmental Issues  
 2002 Spring: (ATSC 5880-02) Topics in atmospheric aerosols  
 2001 Summer: (NASC 5120) Earth Science in Global Context - Natural Sciences Program  
 2001 Spring: (Physics 418) Physics of Atmospheres, University of Canterbury, Christchurch, New Zealand  
 1999 Fall: (ATSC 2000) Introduction to Meteorology, (ATSC 4010) Atmospheric Processes , (HP4152) Senior Honors Seminar on Global Environmental Issues  
 1999 Summer: Engineering Summer Program (ESP)  
 1999 Spring: (ATSC 5180) Weather Briefings.  
 1998 Fall: (ATSC 5100) Atmospheric Dynamics I; (ES 2330) Fluid Dynamics  
 1998 Summer: (NASC 5760) Earth Systems Science  
 1998 Spring: (ATSC 5180) Weather Briefings.  
 1997 Fall: (ATSC 5100) Atmospheric Dynamics I  
 1997 Summer: Engineering Summer Program (ESP)  
 1997 Spring: (ATSC 5180) Weather Briefings.  
 1996 Fall: (ATSC 5100) Atmospheric Dynamics I; (HP 4152) Senior Honor Seminar.  
 1996 Summer: Engineering Summer Program (ESP)  
 1996 Spring: (ATSC 5180) Weather Briefings; (ES 2330) Fluid Dynamics  
 1995 Fall: (ATSC 5100) Atmospheric Dynamics I  
 1995 Spring: (ATSC 5500) Atmospheric Radiation and Optics  
 1994 Fall: (ATSC 5150) Introduction to Weather Analysis (with Mark Hervig)  
 1994 Summer: Engineering Summer Program (ESP)  
 1994 Spring: (ATSC 2000) Introduction to Meteorology; (ATSC 5900) Practicum: college teaching  
 1993 Fall: (ATSC 2000) Introduction to Meteorology; (ATSC 5900) Practicum: college teaching  
 1993 Summer: Engineering Summer Program (ESP), High School Teachers Engineering Program (HISTEP)  
 1992 Fall: (ATSC 2000) Introduction to Meteorology, (ATSC 5900) Practicum: college teaching  
 1992 Spring: (ATSC 2000) Introduction to Meteorology; (ATSC 5900) Practicum: college teaching  
 1990 Spring: (PHYS 431) College Physics III (modern physics)

## EXTERNAL FUNDING

### Pending Support

### Current Support

**National Aeronautics and Space Administration**, Spring 2021 – Spring 2024

**PI:** Lars Kalnajs, CoPI: Terry Deshler (1 month/year)

**Title:** Coordinated In Situ Aerosol Size Distribution Measurements For Comparison And Validation Of SAGE III-ISS Aerosol Extinction And Surface Area Density

**Location:** Boulder, Colorado

**National Science Foundation**, \$68,230, June 2018 – July 2023

**PI:** T. Deshler, CoPI: Lars Kalnajs

**Title:** Antarctic Condensation Nuclei Supplement for Extended Field Measurements

**Location:** Boulder, Colorado, McMurdo Station, Antarctica

**National Science Foundation**, \$565,367, June 2018 – July 2023

**PI:** T. Deshler (1.7 months/year), **CoPI:** Lars Kalnajs

**Title:** Measurements of Stratospheric Aerosol to Altitudes above 35 km in Austral Autumn

**Location:** Boulder, Colorado, McMurdo Station, Antarctica

**National Science Foundation**, \$1,258,064, 1 January 2017 – 31 December 2022

**PI:** T. Deshler (1 month/year), **CoPIs:** Sean Davis, Lars Kalnajs

**Title:** Investigating water vapor, clouds, and aerosol in the tropical tropopause layer with in situ and profiling measurements from long duration STRATEOLE-2 balloons.

**Location:** Boulder, Colorado, Seychelles

### Completed Grants

**National Aeronautics and Space Administration**, Spring 2018 – Spring 2021

**PI:** Lars Kalnajs, **CoPI:** Terry Deshler (1 month/year)

**Title:** Coordinated In Situ Aerosol Size Distribution Measurements For Comparison And Validation Of SAGE III-ISS Aerosol Extinction And Surface Area Density

**Location:** Boulder, Colorado

**National Science Foundation**, ~~\$874,591, May 2016 – May 2019~~, \$366,000, August 2016 – July 2019

**PI:** T. Deshler (1.7 months/year), **CoPI:** Lars Kalnajs

**Title:** Next Generation In Situ Measurements of Stratospheric Aerosol

**Location:** Boulder, Colorado

**University of Saskatchewan**, \$38,077, 1 April – 31 December 2017

**Collaborators:** T. Deshler, Lars Kalnajs

**Title:** Tropical measurements of the stratospheric aerosol size distribution

**Location:** Alice Springs, Australia

**National Science Foundation**, ~~\$404,940 + \$173,547~~ \$274,782 + \$117,764 cost share, August 2012 –

August 2016, **PI:** T. Deshler, **CoI:** S. Murphy, **Title:** MRI: Development of new particle size spectrometer for rugged deployments in the Antarctic, tropics and mid-latitudes: Measurements from the surface to the stratosphere. **Location:** Laramie, Wyoming, **Submitted:** 26 January 2012. **Revised:** 19 June 2012. **Approved:** 20 August 2012

**National Science Foundation**, \$1,052,952, September 2010 – September 2016, **PI:** T. Deshler (1 month).

**Title:** In situ measurements of stratospheric aerosol size distributions and their use in a new aerosol surface area climatology. **Location:** Laramie, Wyoming. **Submitted:** 24 November 2009. **Approved:** June 2010

**National Aeronautics and Space Administration**, \$104,337, May-June 2014, **PI:** Duncan Fairlie, **CoIs:** J.-P. Vernier, T. Deshler, C. Trepte, L.W Thomason, T. Knepp, F. Wienhold, A. Tupper, K. Bedka, S. Young, **Title:** The K1Ash campaign - A Rapid Response for Balloon Measurements of the Mt. Kelud Volcanic Plume. **Location:** Darwin, Australia.

**Wyoming Water Development Commission**, 219,000, June 2010- July 2015, **PI:** T. Deshler, **Title:** Member technical advisory team for the Wyoming weather modification pilot project. Advisor to graduate student working on analysis for the pilot project.

**National Science Foundation**, \$350,251, Nov 2007 - March 2011, **PI:** T. Deshler (0 months), **CoI:** J.

Mercer (1 months), **Title:** Quasi-Lagrangian measurements of polar stratospheric cloud particle development from long-duration balloon platforms, **Location:** McMurdo Station, Antarctica

**Submitted:** 7 June 2006 **Tentatively Approved:** August 2007. Extended to field season in Aug-Oct 2010. One year no-cost extension to March 2012

**National Science Foundation**, \$586,581, May 2009 - May 2011, **PI:** T. Deshler (1 month). **Title:**

Measurements of Antarctic ozone and polar stratospheric cloud profiles in a time of decreasing atmospheric chlorine, climate change, and fluctuations in polar vortex strength. **Location:** McMurdo Station, Antarctica. **Submitted:** 6 June 2008. **Approved:** May 2009

**National Science Foundation**, \$797,160, January 2005 - January 2010, **PI:** T. Deshler (1 month).

**Title:** Balloon-borne in situ measurements of aerosol size and concentration in the mid latitudes and tropics. **Location:** Laramie, Wyoming, Darwin Australia, Niamey Niger, Teresina, Brazil. **Submitted:** 4 May 2004, **Approved:** 25 October 2004

**National Science Foundation**, \$760,347, May 2006 - April 2009, **PI:** T. Deshler (1 months), **CoI:** J. Mercer (10 months), **Title:** Measurements addressing the initial stages of ozone recovery, the nucleation of, index of refraction of, and existence of large PSC particles, **Location:** McMurdo Station, Antarctica **Submitted:** 2 June 2005, Approved pending budget revisions March 2006, final approval May 2006.

**National Science Foundation**, \$497,759, October 2002 – March 2008. **PI:** T. Deshler (0 months/yr), P. Wechsler (5 months/yr). **Title:** Development of a suite of balloonborne aerosol instruments to provide size resolved concentration measurements between 0.03 and 30  $\mu\text{m}$ . Location: Laramie, Wyoming, Submitted: January 24, 2002, Approved July 2002

**National Science Foundation**, \$279,378, January 2005 - January 2008. **PI:** T. Deshler (0.5 month), **CoI:** D. Montague (1 month). **Title:** Comprehensive measurements of surface atmospheric aerosol to test predictions of radiative and hygroscopic properties of that aerosol. **Location:** Laramie, Wyoming **Submitted:** 4 June 2004, **Approved:** November 2004.

**National Aeronautics and Space Administration**, \$39,000, June 2004 - November 2007. **PI:** T. Deshler.(0.22 Month) **Title:** *In situ* aerosol profile measurements and comparisons with SAGE III aerosol extinction and surface area profiles at 41°N. Location: Laramie, Wyoming.

**National Science Foundation**, \$741,383, September 2003-August 2006. **PI:** T. Deshler (1 month/yr). **Title:** Measurements addressing quantitative ozone loss, polar stratospheric cloud nucleation, and large polar stratospheric particles during austral winter and spring, Location: McMurdo Station, Antarctica, Submitted: May 31, 2002, Approved: December 2002.

**National Science Foundation**, \$248,407, March 2001 – March 2005. **PI:** T. Deshler (1 month/yr). **Title:** Particle Size Distributions Within Arctic Polar Stratospheric clouds in conjunction with correlative measurements of composition, optical scattering and gas phase water vapor concentrations. Location: Kiruna, Sweden, Submitted: August 8, 2000, Approved February 2001

**World Meteorological Organization:** \$36,000, June 2003 - December 2004, **PI:** T. Deshler, **Title:** Balloon Experiment testing Standard operating procedures for Ozone Sondes (BESOS), Location: Laramie, Wyoming, Submitted: February 2003, Approved: March 2003.

**National Aeronautics and Space Administration**, \$179,513, August 2002 - November 2004, **PI:** T. Deshler (2 months/yr). **Title:** *In situ* aerosol profile measurements and comparisons with SAGE III aerosol extinction and surface area profiles at 68°N. Location: Kiruna, Sweden, Submitted: April 30, 2002, Approved August 2002

**W. M. Keck Foundation**, \$800,000, January 2000 - January 2004, **PI:** T. Deshler (1 months/yr), **Co-Is:** Gabor Vali, Derek Montague. **Title:** Enhancement of atmospheric aerosol research at the University of Wyoming. Location: Laramie, Wyoming, Submitted: September 15, 1999, Approved January 2000

**National Science Foundation**, \$750,000, August 2000 - August 2003, **PI:** T. Deshler (2 months/yr). **Title:** Measurements of polar stratospheric clouds, condensation nuclei, and ozone during austral winter and spring. Location: McMurdo Station, Antarctica, Submitted: June 1, 1999; Approved March 2000; Money arrives September 2000

**National Science Foundation**, \$554,561, October 1998 - Oct. 2002 **PI:** T. Deshler (2 months/yr). **Title:** Vertical profiles of CN and aerosol  $\geq 0.15 - 2.0 \mu\text{m}$  radius from the surface to 30 km and of cloud condensation nuclei from the surface to 13 km at a remote continental site. Location: Laramie, Wyoming, Submitted: September 1997, approved October 1998

**National Aeronautics and Space Administration**, \$138,058, October 1998 - October 2001 **PI:** T. Deshler (1 months/yr), **CoI:** M. E. Hervig. **Title:** Evaluation of SAGE II and balloon-borne stratospheric aerosol measurements. Location: Laramie, Wyoming, Submitted: June 1998, Approved November 1998

**National Aeronautics and Space Administration**, \$343,323, January 1998 - January 2001, **PI:** M. E. Hervig (**PI**) and T. Deshler (**CoI**) (1 months/yr). **Title:** Investigations of sulfate aerosols and polar stratospheric clouds using combined observations from UARS, AVHRR, and in situ optical particle counters. Location: Laramie, Wyoming, Submitted: June 1997

**National Science Foundation**, \$179,832, Dates: 15 August 1997 – 15 August 2001, **PI:** T. Deshler (1.3 months/yr). **Title:** Simultaneous in situ measurements within polar stratospheric clouds of particle size, number, composition, scattering ratio, and of gas phase concentrations of nitric acid and water: A collaborative effort within THESEO. Location: Kiruna, Sweden, Submitted: December 1996, Approved June 1997

**National Science Foundation**, \$641,936, 1 March 1997 - 1 March 2000, **PI:** T. Deshler (2 months/yr) **Title:** In situ measurements of polar stratospheric clouds spanning the austral winter, and of ozone from late winter to early spring. Location: McMurdo Station, Antarctica, Submitted: June 1996

**National Science Foundation**, \$241,999, 21 May 1996 - 1 June 1999, **PI:** T. Deshler (1.7 months/yr). **Title:** Vertical profiles of aerosol concentration in conjunction with simultaneous measurements of the vertical profiles of several long-lived tracers and several ozone destroying radicals: A latitude survey. Location: Norway, France, Brazil

**National Aeronautics and Space Administration**, \$36,891, 1 March 1997 - 1 June 1998, **PI:** T. Deshler (0.5 months/yr) **CoPI:** M. E. Hervig. **Title:** An investigation of aerosol measurements from the Halogen Occultation Experiment: Validation, size distributions, composition, and relation to other chemical species. Location: Laramie, Wyoming, Submitted: December 1996

**National Aeronautics and Space Administration**, \$386,437, 1 March 1993 - January 1998, **PI:** T. Deshler (1.5 months/year), J. Snider, and G. Vali. **Title:** Vertical profiles of cloud condensation nuclei, condensation nuclei, optical aerosol, aerosol optical properties, and aerosol volatility measured from balloons. Location: Laramie, Wyoming

**National Institute for Environmental Studies, Tsukuba, Japan**, \$25,344, 1 November 1996 - 31 December 1997, **PI:** T. Deshler (1 month). **Title:** Aerosol concentration measurements in support of ILAS validation using balloonborne instruments. Location: Kiruna, Sweden

**National Aeronautics and Space Administration**, \$164,773, 1 October 1994 - November 1997, **PI:** T. Deshler (1 month/yr) **Co-PI:** D. Montague. **Title:** An investigation of aerosol measurements from the Cryogenic Limb Array Etalon Spectrometer: Validation, size distributions, composition, and relation to other chemical species. Location: Laramie, Wyoming

**National Aeronautics and Space Administration**, \$141,144, 1 March 1994 - 1 March 1997, **PI:** T. Deshler. **Title:** An investigation of aerosol measurements from the Halogen Occultation Experiment: Validation, size distributions, composition, and relation to other chemical species. Location: Laramie, Wyoming

**National Science Foundation**, \$1,278,496, 1 March 1994 - 1 March 1997, **PI:** T. Deshler. **Title:** Vertical profiles of polar stratospheric clouds, condensation nuclei, ozone, nitric acid, and water vapor in the Antarctic winter and spring stratosphere. Location: McMurdo Station, Antarctica

**Naval Research Laboratory**, \$111,129, 30 April 1994 - 30 April 1997, **PI:** T. Deshler. **Title:** Vertical profiles of stratospheric aerosol and ozone in the polar regions: correlative measurements for POAM-II. Location: McMurdo Station, Antarctica, and Kiruna, Sweden

**Max Planck Institut for Kernphysik**, \$40,000, September 1994 - December 1996, **PI:** T. Deshler. **Title:** The chemical composition of stratospheric aerosol, simultaneous aerosol concentration and composition measurements. Location: Kiruna, Sweden; Aire Adour, France

**National Science Foundation**, \$205,803, 1 February 1993 - 31 October 1995, **PI:** T. Deshler. **Title:** In situ measurements of polar stratospheric clouds and condensation nuclei in the arctic stratosphere in conjunction with simultaneous measurements of the nitric acid vapor profile. Location: Kiruna, Sweden

**National Aeronautics and Space Administration**, \$80,965, June 1994 - June 1995, **PI:** T. Deshler. **Title:** Continuation of in situ aerosol measurements for the UAR's Correlative Measurements Program. Location: Laramie, Wyoming

**National Oceanic and Atmospheric Administration**, \$18,372, 24 February 1994 - 31 December 1994, **PI:** T. Deshler. **Title:** Calibration of ozonesonde pumps for NOAA. Location: Laramie, Wyoming

**National Science Foundation**, \$1,148,954, 1 March 1991 - 1 March 1994, **PI:** T. Deshler. **Title:** In situ measurements of polar stratospheric clouds, condensation nuclei, and ozone in the springtime Antarctic stratosphere. Location: McMurdo Station, Antarctica

**National Oceanic and Atmospheric Administration**, \$14,778, 23 June 1993 - 28 February 1994, **PI:** T. Deshler. **Title:** NOAA MASC ozonesonde pumps at South Pole. Location: Laramie, Wyoming

**National Oceanic and Atmospheric Administration**, \$102,852, 1 July 1992 - 31 December 1993, **PI:** T. Deshler. **Title:** Ozone measurements at South Pole Station and correlative aerosol measurements for SAGE and UARS overpasses. Location: Laramie, Wyoming

**National Science Foundation (REU supplemental request)**, \$2,500, 1 February 1992 - 1 February 1993, **PI:** T. Deshler. **Title:** Formation of condensation nuclei in the Antarctic spring stratosphere: Comparison of measurement with theory.

**National Science Foundation (REU supplemental request)**, \$3,750, 1 February 1992 - 1 February 1993, **PI:** T. Deshler. **Title:** Development of an automated method for pressure calibration of ozonesonde pumps.

**National Science Foundation**, \$674,750, 1 February 1990 - 1 February 1993, **PI:** T. Deshler and D. J. Hofmann. **Title:** Study of Stratospheric Aerosols and Their Heterogeneous Effects on Ozone.

**Max Planck Institut for Kernphysik**, \$24,000, 18 December 1991 - 18 December 1992, **PI:** T. Deshler. **Title:** Simultaneous measurements of polar stratospheric clouds and nitric acid vapor during the European Arctic Stratospheric Ozone Experiment.

**National Oceanic and Atmospheric Administration**, \$12,523, 1 July 1991 - 1 July 1992, **PI:** T. Deshler. **Title:** Ozone and water vapor measurements at South Pole Station.

**National Science Foundation (REU supplemental award)**, \$5,000, 1 February 1991 - 1 February 1992, **PI:** T. Deshler. **Title:** Study of the formation and growth of an enhanced layer of condensation nuclei within the Antarctic polar vortex in late winter.

#### Unfunded Proposals

**National Aeronautics and Space Administration:** \$99,373, June 2015- December 2015, **PI:** T. Deshler, **Title:** Balloon measurements of the Asian tropopause Aerosol Layer (BATAL) 2015.

**National Aeronautics and Space Administration:** \$1,100,946, June 2014-2017, **PI:** Didier Rault, **CoIs:** P. Colarco, V. Aquila, T. Deshler, A. da Silva, A. Fleig, **Title:** Global Stratospheric Aerosols as measured by the OMPS Limb Profiler (OMPS/LP), Submitted March 2014.

**National Science Foundation**, \$852,478, June 2012 – June 2015, **PI:** T. Deshler (1 month), **CoIs** – Derek Montague, Shane Murphy, Yong Cai. **Title:** The size dependent impact of coated black carbon particles on light absorption and cloud droplet nucleation for mid continental atmospheric aerosol. **Location:** Laramie and Elk Mountain, Wyoming. **Submitted:** 16 December 2011. **Declined:** 13 June 2012

**National Science Foundation**, \$725,151, May 2010 - May 2013, **PI:** T. Deshler (1 month), **CoI:** D. Montague. **Title:** The size dependent impact of black carbon on the radiative and cloud droplet nucleating properties of atmospheric aerosol. **Location:** Laramie, Wyoming. **Submitted:** 16 June 2009 **Declined:** 24 Sept. 2009

**National Science Foundation**, \$289,310, January 2008 – January 2011, **PI:** T. Deshler (2 months) **Title:** **IPY: GLIMPSE**-Airborne Studies of polar stratospheric cloud particle formation mechanisms near the Antarctic Peninsula. **Location:** Punta Arenas, Chile **Submitted:** 9 March 2007. **Delayed** for consideration for one year due to unavailability of Hiaper instrumentation. **Declined** 16 June 2009 due to unavailability of Hiaper lidar.

**National Science Foundation**, \$378,084, January 2008 – January 2011, **PI:** T. Deshler ( months) **Title:** **IPY:** Ice Formation in Support of the Mass of the Polar Ice Caps Experiment (MSPICE) **Location:** South Pole, Antarctica **Submitted:** 9 March 2007. **Declined** 7 Sept. 2007

**National Aeronautics and Space Administration**, \$387,863, February 2006 - February 2009, **PI:** T. Deshler (0.33 Month), **CoI:** Zhien Wang (1 Month) **Title:** Comprehensive Surface Aerosol Physicochemical and Lidar Profile Measurements to Improve our Understanding of Mid-Continental Aerosol and of Models for Retrieval of Aerosol Properties from Satellite Measurements. **Location:** Laramie, Wyoming. **Submitted:** 15 June 2005.

**Office of Science, Department of Energy**, \$269,389, November 2004 - November 2007, **PI:** T. Deshler (0.5 month), **CoIs:** D. Montague (1 month), P. Liu (1.25 month) **Title:** Aerosol physical and chemical characterization: Interrelationship between size-resolved chemistry, extinction, and cloud condensation nucleus concentration **Location:** Laramie, Wyoming **Submitted:** 16 June 2004. **Declined:** December 2004.

**National Aeronautics and Space Administration**, \$254,551, **PI:** T. Deshler (2 months/yr). **Title:** *In situ* aerosol profile measurements and comparisons with SAGE III aerosol extinction and surface area

- profiles in the southern mid latitudes, Location: Lauder, New Zealand, Submitted: May 30, 2002, Declined April 2003.
- National Aeronautics and Space Administration**, \$277,278, **PI:** T. Deshler (2 months/yr), **Co-I:** Mark Hervig. **Title:** Accurate Global Stratospheric Aerosol Surface Area Values for Modeling of Stratospheric Chemistry: University of Wyoming Portion. Location: Laramie, Wy, Submitted: November 25, 2000 - Rejected 6 June 2001
- National Aeronautics and Space Administration**, \$242,623, **PI:** R. Friedel, JPL; CoIs: D.Tooney, Univ. of Colorado; T.Deshler (1 months/yr). **Title:** In Situ Sampling of Airborne Chemical Hazards, Submitted: April 21, 2000 - Rejected: Fall 2000
- National Science Foundation**, \$259,595, **PI:** T. Deshler (1 months/yr). **Title:** Particle Size Distributions Within Arctic Polar Stratospheric clouds in conjunction with correlative measurements of composition, optical scattering and gas phase water vapor concentrations. Location: Kiruna, Sweden, Submitted: February 15, 2000 - Rejected 18 July 2000
- National Aeronautics and Space Administration**, \$266,274, **PI:** T. Deshler (2 months/yr), **Co-I:** Mark Hervig. **Title:** Global stratospheric aerosol surface area values for modeling of stratospheric chemistry: University of Wyoming-NASA Langley portion, Location: Laramie, Wy, Submitted: September 27, 1999 - Rejected March 2000
- National Aeronautics and Space Administration**, \$250,329, **PI:** T. Deshler (1 months/yr), **CoI:** M. E. Hervig. **Title:** Profiles to 30 km of aerosol size distribution in conjunction with collaborative measurements of halogen radicals and CFC-12 in the Arctic vortex in conjunction with SOLVE. Location: Kiruna, Sweden, Submitted: August 1998 - Rejected December 1998
- National Aeronautics and Space Administration**, \$80,188, **PI:** B. Nardi and T. Deshler (0.5 months/yr). **Title:** Balloon-borne ozone measurements from mid latitudes and Antarctica for validation of TOMS total ozone and tropospheric ozone products. Location: Laramie, Wyoming, Submitted: August 1997 - Denied: January 1998
- National Aeronautics and Space Administration**, \$146,090, **PI:** T. Deshler. **Title:** Measurements of vertical profiles of aerosol concentration in conjunction with satellite overpasses of the SAGE instrument: Comparisons of aerosol extinction and surface area., Location: Laramie, Wyoming, Submitted: July 1995 - Rejected: January 1996.
- National Aeronautics and Space Administration**, \$334,358, **PI:** T. Deshler. **Title:** The size and volatility of condensation nuclei and optical aerosol near the tropopause, measured from balloons, Location: Laramie, Wyoming, Submitted: December 1993 - Rejected: May 1994
- National Aeronautics and Space Administration**, \$125,296, **PI:** T. Deshler. **Title:** Optical aerosol and condensation nuclei in the stratosphere measured from the Perseus platform: Adaptation of current balloon-borne instruments. Location: Laramie, Wyoming, Submitted: August 1992 - Rejected: December 1992
- National Oceanic and Atmospheric Administration**, \$121,140, **PI:** T. Deshler and G. Vali. **Title:** Tropospheric aerosol particles, comparison of vertical profiles of number concentration and light scattering coefficient with similar surface measurements at a clean mid-continent site. Location: Laramie, Wyoming, Submitted: May 1992 - Rejected: November 1992
- National Science Foundation**, \$968,080, **PI:** T. Deshler, J. R. Snider, J. J. Toth. **Title:** In situ measurements of polar stratospheric clouds, condensation nuclei, water vapor, ozone, and nitrogen dioxide in the Arctic stratosphere, Location: Kiruna, Sweden, Submitted: March 1992 - Rejected: July 1992
- National Science Foundation**, \$11,679, **PI:** T. Deshler. **Title:** Jet stream ozone and particle experiment. Submitted: January 1992, No decision ever received.
- National Oceanic and Atmospheric Administration**, \$79,612, **PI:** T. Deshler and G. Vali. **Title:** Tropospheric aerosol, measurement of their vertical profile, size distribution, horizontal variability, and chemical composition over a clean mid-continent site. Submitted: March 1991 - Rejected: July 1991.

## Summary

Dr. Terry Deshler, **professor emeritus** of Atmospheric Science at the University of Wyoming, and **research scientist** at the University of Colorado has directed and analyzed balloon-borne measurements of stratospheric aerosol and ozone in the mid latitudes and polar regions of both hemispheres since 1988. His interests have included documenting the severe ozone loss observed above Antarctica each year, investigating polar stratospheric clouds in both hemispheres, and measuring mid latitude stratospheric aerosol, including the effects of major volcanic eruptions. Polar stratospheric clouds are essential pre-cursors to polar ozone loss. Mid latitude stratospheric aerosol play a role in the chemical and radiation balance of the stratosphere. Dr. Deshler has published widely in these areas (author or co-author of over 150 refereed scientific publications), author or co-author of four book chapters, and has contributed to several of the United Nations Environment Program/World Meteorological Organization (UNEP/WMO) ozone assessment reports. He retired as director the stratospheric aerosol measurements in the Dept. of Atmospheric Science maintaining a staff including an engineer, technician, and graduate students through external funding of this research for over 20 years. Currently he works part-time at the Laboratory for Atmospheric and Space Physics, University of Colorado with young colleagues who are continuing Dr. Deshler's research emphasis on balloon-borne in situ measurements in the stratosphere.

**Graduate Education:** Dr. Deshler directed thirteen M.S. students, five Ph.D. students and four post-doctoral scholars.

**Invited Presentations:** Prof. Deshler has given over 50 invited talks and seminars on the subject of his research.

**External Support:** Since 1990 Dr. Deshler has been the principal investigator on projects with a combined budget of over \$15 million. This support has come from the: National Science Foundation, National Aeronautics and Space Administration, W. M. Keck Foundation, Naval Research Laboratory, National Aeronautics and Oceanic Administration, and several international agencies. Currently Dr. Deshler is directing two research projects with a total annual budget of over \$200,000.

**Education:** Ph.D. **Physics**, May 1982; M. S. **Atmospheric Sciences**, August 1975; B. A. **Mathematics**, June 1969, all from the **University of Wyoming**

### **Professional Experience:**

September 2016 – Present: **Research Scientist** part-time, Laboratory for Atmospheric and Space Physics, University of Colorado, 1234 Innovation Drive, Boulder, Colorado.

September 2014 – Present: **Professor Emeritus**, Dept. of Atmospheric Science, University of Wyoming; **Professor**, August 1999 – August 2014; **Associate Professor**, July 1994 – July 1999; **Assistant Professor**, August 1991 - June 1994.

1988 - 1991: **Research Scientist**, Dept. of Physics and Astronomy, University of Wyoming.

1985 - 1988: **Meteorologist**, Bureau of Reclamation, US Department of Interior, Auburn, CA.

1982 - 1984: **Software Engineer**, In-Situ Inc., Laramie, WY

1976 - 1976: **Support Scientist II**, National Center for Atmospheric Research, Boulder, CO

1974 - 1975: **Radar Meteorologist**, Atmospheric Inc., (Duty station, Kericho, Kenya)

1969 - 1971: **Peace Corps Volunteer**, Action, Washington, DC (Duty station, Kisii, Kenya)



## Alternate summary

Dr. Terry Deshler's research interests are on the impact of atmospheric aerosol (particles) on chemical, radiative, and hydrologic atmospheric processes. For the past 25 years he has directed and analyzed balloon-borne measurements of stratospheric aerosol and ozone in the mid latitudes, polar regions, and tropics of both hemispheres. His interests include Antarctica ozone loss, polar stratospheric clouds in both hemispheres, mid latitude stratospheric aerosol, including the effects of major volcanic eruptions, and aerosol instrumentation. Polar stratospheric clouds are essential pre-cursors to polar ozone loss. Mid latitude stratospheric aerosol play a role in the chemical and radiation balance of the stratosphere. Terry is an author or co-author on over 150 scientific papers published in these areas, has contributed to several of the UNEP/WMO ozone assessment reports and the SPARC Assessment of Stratospheric Aerosol Particles, and has completed measurements in a number of international field campaigns in the Arctic and Antarctic. These required several trips from the Arctic to the Antarctic in less than a week. The most recent work involves new quasi-Lagrangian lower stratospheric measurements from drifting balloons developed by the French space agency, CNES. Balloon measurements from Laramie have been completed since 1971, and continue. Every few months you may catch sight of one of these scientific plastic balloons released from near the Laramie airport at sunrise.

Used Oct 2013

Terry Deshler, a Professor Emeritus from the University of Wyoming, has directed research on the impact of atmospheric aerosol (particles) on chemical, radiative, and hydrologic atmospheric processes for the past 25 years. This work has led to balloon-borne measurements of stratospheric aerosol and ozone in the mid latitudes, polar regions, and tropics of both hemispheres. His interests include Antarctica ozone loss, polar stratospheric clouds in both hemispheres, mid latitude stratospheric aerosol, including the effects of major volcanic eruptions, and aerosol instrumentation. Terry is an author or co-author on over 120 scientific papers published in these areas, has contributed to several of the UNEP/WMO ozone assessment reports and the SPARC Assessment of Stratospheric Aerosol Particles. Balloon-borne measurements of aerosol from Laramie have been completed since 1971, and continue to today under his direction.

Intros for science talks at McMurdo

May 2019 –

Dr. Terry Deshler, a professor emeritus from the University of Wyoming, is now a part-time research scientist at the Laboratory for Atmosphere and Space Physics (LASP) at the University of Colorado, where he works with Dr. Lars Kalnajs also at LASP, as Lars develops and deploys a new generation of in situ instruments to measure aerosol in the stratosphere. Since 2017 these instruments have been used for measurements from Laramie, Wyoming; Boulder, Colorado; Alice Springs, Australia; Timmons, Canada; McMurdo, and soon Costa Rica, and from an around the world balloon to be released from the Seychelles.

Terry has analyzed balloon-borne measurements of stratospheric aerosol and ozone in the mid latitudes and Polar Regions of both hemispheres since 1988, his first year at McMurdo. Lars has been a Research Scientist at LASP since 2009. In 2015 his interests in surface aerosol, snow, and halogen chemistry were diverted to stratospheric aerosol by Terry who suggested there was both an opportunity and a need to maintain expertise in stratospheric aerosol measurements from balloons. Lars's first year in McMurdo was 2004 working on halogen chemistry and volunteering for Terry's ballooning team. Terry's previous last year in McMurdo was 2014 volunteering on Lars's surface measurement team.

June 2019 - Dr. Terry Deshler is a professor emeritus from the University of Wyoming where he served on the faculty for 23 years, retiring in 2014. During that time his research interests were on the impact of atmospheric aerosol (particles) on chemical, radiative, and hydrologic atmospheric processes, include Antarctica ozone loss, polar stratospheric clouds in both hemispheres, mid latitude stratospheric aerosol, and the atmospheric effects of major volcanic eruptions. Terry is an author or co-author on over 150 scientific papers and four book chapters published in these areas. As a faculty member his primary teaching responsibilities centered on the graduate course in atmospheric radiation. The last class in that semester long course was always atmospheric optics, and occasionally students from the previous year would return to sit in again on that fun day. So here we are the last day of the atmospheric radiation course.