Sean M. Davis

curriculum vitae

NOAA Earth System Research Laboratory
Chemical Sciences Division
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SCIENTIFIC SKILLS AND COMPETENCIES

- Leadership in construction and maintenance of a satellite climate data record of stratospheric water vapor and ozone
- Policy-relevant analysis of stratospheric composition and climate changes, with an emphasis on stratospheric water vapor and ozone
- Development and use of atmospheric models and analyses to interpret in situ and satellite measurements and improve understanding of atmospheric processes
- Leadership in international activities to assess understanding of stratospheric water vapor, ozone, and climate processes such as tropical widening

EDUCATION

Ph.D., Atmospheric Science, University of Colorado, 2007
B.S., Physics (Honors), Cum Laude, University of Tulsa, 2001

PROFFESIONAL EXPERIENCE

NOAA Earth System Research Laboratory, Chemical Sciences Division:
2014-present CIRES Research Scientist II
NOAA Earth System Research Laboratory, Chemical Sciences Division:
2011-2014 CIRES Research Scientist I
NOAA Earth System Research Laboratory, Chemical Sciences Division:
2008-2011 CIRES Postdoctoral Research Associate, Karen H. Rosenlof (advisor)
Laboratory for Atmospheric and Space Physics, University of Colorado:
2008 Research Associate
Laboratory for Atmospheric and Space Physics, University of Colorado:
2002-2007 Graduate Research Assistant, Prof. Linnea Avallone (advisor)
Space and Atmospheric Sciences Group, Los Alamos National Laboratory:
2001-2002 Research Assistant, Dr. David Susczynsky (advisor)

LEADERSHIP, SERVICE, TEACHING

Leader: International Space Sciences Institute "Tropical Width Impacts On The Stratosphere (TWIST)" team, 2019 –
Co-chair: Middle Atmosphere One-day Symposium, 2020
Co-Leader: Stratosphere-Troposphere Processes and their Role in Climate (SPARC) Reanalysis Intercomparison Project (S-RIP) Water Vapor and Ozone Chapter, 2012 – present
Lead Author: Stratospheric Water Vapor Section, NOAA State of the Climate Report, 2015 – present
Reviewer: Scientific Assessment of Ozone Depletion, Chapter 3: Global stratospheric ozone: Past, present & future, 2018
Lead: International Space Sciences Institute "Tropical Width Diagnostics Intercomparison Project" team, 2016 – 2018
Meeting Co-Chair: AMS 20th Conference on the Middle Atmosphere, 2019
Science Team Member: SAGE III-ISS ozone and water vapor and satellite instrument, 2018 –
Working Group Member: SPARC Reanalysis Intercomparison Project (S-RIP), 2012 –
Co-Leader: NOAA Chemical Sciences Division seminar coordinator, 2017 –
Lead: U.S. CLIVAR Working Group on Changing Width of the Tropical Belt, Metrics Subgroup, 2016 –
Lead: CIRES "Stratospheric Radiative and Chemical Processes That Affect Climate" project, 2012 –
Member: AMS Middle Atmosphere Committee 2015 –
Member: AMS Bernhard Haurwitz Lecture Selection Committee, 2015, 2016
Mentor: STEM Teacher And Researcher (STAR) Program, 2015
Lead Convener: AGU Chapman Conference on "The Width of the Tropics: Climate Variations and their Impacts", 2015
Contributor: NOAA State of the Climate Report, 2014

Contributing Author: 5th Assessment Report, Working Group I, Intergovernmental Panel on Climate Change
Journal Reviewer: J. Geophys Res., Geophys. Res. Let., J. Climate, Atmos. Chem. Phys., Nature
Lead Instructor: Metropolitan State College of Denver, MTR 3440, Physical Meteorology – Atmospheric Radiation and Cloud Physics, Spring 2008
Seminar Coordinator: CU Department of Atmospheric and Oceanic Sciences, 2008
Advisor/Instructor: Earthworks Earth System Science Workshop for Secondary Teachers, 2004-2006
Lead Coordinator: CU Atmospheric and Oceanic Sciences Journal Club, 2003-2006
Teaching Assistant: University of Colorado,

- ATOC 1060, Our Changing Environment, Spring 2006
- ATOC 1050, Introduction to Weather and the Atmosphere, Fall 2002
- ATOC 1070, Introduction to Weather and the Atmosphere Laboratory, Fall 2002

HONORS, AWARDS, GRANTS

TED talk: "Can we solve global warming? Lessons from how we protected the ozone layer" http://go.ted.com/seandavis
Science PI: NASA ACMAP grant, "Validation of SAGE III water vapor and ozone products to facilitate their inclusion in a long-term climate data record", $464k, 2018.
TEDx Boulder speaker: Talk on "Lessons from the World Avoided", 2017
CO-PI (T. Deshler, PI): NSF grant, "Investigating water vapor, clouds, and aerosol in the tropical tropopause layer with in situ and profiling measurements from long duration Strateole-2 balloons", $1.3M, 2016.
CO-I (K. Rosenlof, PI): NOAA High Performance Computing grant, "Climate Forecast System Reanalysis model-level products for reanalysis validation and intercomparison", 2016.
Collaborator (H. Selkirk, PI): NASA grant, "TICOSONDE: Balloon sonde observations of tropical water vapor and ozone at Costa Rica in support of continued capability for calibration and validation of satellite measurements", $1.0M, 2016.
Collaborator (L. Kalnajs, PI): NSF grant, "Investigating Thermal Structure, Dynamics, and Dehydration in the Tropical Tropopause Layer with Fiber Optic Temperature Profiling from Strateole-2 Balloons", $1.0M, 2016.
Lead: for International Space Sciences Institute "Tropical Width Diagnostics Intercomparison Project" team, 2016
Lead: AGU Chapman Conference proposal for tropical width meeting, 2015.
PI: CIRES Innovative Research Grant, "Blowing in the wind: Fiber optic temperature profiler measurements from high altitude balloons", funded 2014
CO-I/Science PI: NASA ACMAP grant, "Stratospheric ozone and water vapor and the relation to tropical belt extent: a data analysis and modeling study", funded 2013
2 NASA Group Achievement Awards
NRL Alan Berman Research Publication Award for *Bucholtz et al.,* 2010 paper, 2010
Travel Award to attend Water Vapor and the Climate System (WAVACS) summer school, 2009
Outstanding Student Presentation, AMS 14th Conference on the Middle Atmosphere, 2007
NASA Earth System Science Graduate Fellowship, 2006
Travel Award to attend COST-ACTION UTLS summer school, 2005
AMS Global Change Scholarship, 2003
University of Colorado Program in Atmospheric and Oceanic Sciences Fellowship, 2002

PUBLICATIONS (https://publons.com/researcher/1364978/sean-davis/)

Davis, N. A., Davis, S. M., Portmann, R. W., Ray, E., Rosenlof, K. H. and Yu, P.: A comprehensive assessment of tropical stratospheric upwelling in the specified dynamics Community Earth System Model 1.2.2 – Whole Atmosphere Community Climate Model (CESM (WACCM)), Geosci. Model Dev., 13(2), 717–734, doi:10.5194/gmd-13-717-2020, 2020.

Grise, K. M. and Davis, S. M.: Hadley cell expansion in CMIP6 models, Atmospheric Chemistry and Physics, 20(9), 5249–5268, doi:10.5194/acp-20-5249-2020, 2020.]

Szeląg, M. E., Sofieva, V. F., Degenstein, D., Roth, C., Davis, S. and Froidevaux, L.: Seasonal stratospheric ozone trends over 2000–2018 derived from several merged data sets, Atmospheric Chemistry and Physics, 20(11), 7035–7047, doi:10.5194/acp-20-7035-2020, 2020.

Tegtmeier, S., Anstey, J., Davis, S., Dragani, R., Harada, Y., Ivanciu, I., Pilch Kedzierski, R., Krüger, K., Legras, B., Long, C., Wang, J. S., Wargan, K. and Wright, J. S.: Temperature and tropopause characteristics from reanalyses data in the tropical tropopause layer, Atmospheric Chemistry and Physics, 20(2), 753–770, doi:10.5194/acp-20-753-2020, 2020.

Wang, H. J. R., Damadeo, R., Flittner, D., Kramarova, N., Taha, G., Davis, S., Thompson, A. M., Strahan, S., Wang, Y., Froidevaux, L., Degenstein, D., Bourassa, A., Steinbrecht, W., Walker, K. A., Querel, R., Leblanc, T., Beekmann, S. G., Hurst, D. and Hall, E.: Validation of SAGE III/ISS Solar Occultation Ozone Products With Correlative Satellite and Ground-Based Measurements, J Geophys Res-Atmos, 125(11), 103, doi:10.1029/2020JD032430, 2020.

Wargan, K., Kramarova, N., Weir, B., Pawson, S. and Davis, S. M.: Towards a reanalysis of stratospheric ozone for trend studies: Assimilation of the Aura Microwave Limb Sounder and Ozone Mapping and Profiler Suite Limb Profiler data, J Geophys Res-Atmos, 125(4), 2019JD031892, doi:10.1029/2019JD031892, 2020.

Ball, W. T., Alsing, J., Staehelin, J., Davis, S. M., Froidevaux, L. and Peter, T.: Stratospheric ozone trends for 1985–2018: sensitivity to recent large variability, Atmospheric Chemistry and Physics, 19(19), 12731–12748, doi:10.5194/acp-19-12731-2019, 2019.

Grise, K. M., Davis, S. M., Simpson, I. R., Waugh, D. W., Fu, Q., Allen, R. J., Rosenlof, K. H., Ummenhofer, C. C., Karnauskas, K. B., Maycock, A. C., Quan, X.-W., Birner, T. and Staten, P. W.: Recent Tropical Expansion: Natural Variability or Forced Response? J Climate, 32(5), 1551–1571, doi:10.1175/JCLI-D-18-0444.1, 2019.

Staten, P. W., Grise, K. M., Davis, S. M., Karnauskas, K. and Davis, N.: Regional Widening of Tropical Overturning: Forced Change, Natural Variability, and Recent Trends, J Geophys Res-Atmos, 2018JD030100, doi:10.1029/2018JD030100, 2019.

Yu, P., Toon, O. B., Bardeen, C. G., Zhu, Y., Rosenlof, K. H., Portmann, R. W., Thornberry, T. D., Gao, R. S., Davis, S. M., Wolf, E. T., de Gouw, J., Peterson, D. A., Fromm, M. D. and Robock, A.: Black carbon lofts wildfire smoke high into the stratosphere to form a persistent plume, Science, 365(6453), 587–590, doi:10.1126/science.aax1748, 2019.

Adam, O., Grise, K. M., Staten, P., Simpson, I. R., Davis, S. M., Davis, N. A., Waugh, D. W., Birner, T. and Ming, A.: The TropD software package (v1): standardized methods for calculating tropical-width diagnostics, Geosci. Model Dev., 11(10), 4339–4357, doi:10.5194/gmd-11-4339-2018, 2018.

Ball, W. T., Alsing, J., Mortlock, D. J., Staehelin, J., Haigh, J. D., Peter, T., Tummon, F., Stübi, R., Stenke, A., Anderson, J., Bourassa, A., Davis, S. M., Degenstein, D., Frith, S., Froidevaux, L., Roth, C., Sofieva, V., Wang, R., Wild, J., Yu, P., Ziemke, J. R. and Rozanov, E. V.: Evidence for a continuous decline in lower stratospheric ozone offsetting ozone layer recovery, Atmospheric Chemistry and Physics, 18(2), 1379–1394, doi:10.5194/acp-18-1379-2018, 2018.

Davis, N. A. and Davis, S. M.: Reconciling Hadley Cell Expansion Trend Estimates in Reanalyses, Geophysical Research Letters, 45(20), 11,439–11,446, doi:10.1029/2018GL079593, 2018.

Davis, N.A., Davis, S.M., and D.W. Waugh, New insights into tropical belt metrics, *Variations*, 16, 2, doi:10.5065/D69Z93QF, 2018.

Davis, S.M., Hassler, B., and K.H. Rosenlof: Revisiting ozone measurements as an indicator of tropical width, *Progress in Earth and Planetary Science,* 5(56), https://doi.org/10.1186/s40645-018-0214-5, 2018.

Davis, S.M., Hurst, D., Rosenlof, K.H., Selkirk, H.B., and H. Vömel, Stratospheric Water Vapor [in "State of the Climate in 2017"], *Bull. Amer. Meteor. Soc.,99(8), S54–S56, doi:10.1175/2018BAMSStateoftheClimate.1.*, 2018.

Garfinkel, C. I., Gordon, A., Oman, L. D., Li, F., Davis, S. and Pawson, S.: Nonlinear response of tropical lower-stratospheric temperature and water vapor to ENSO, Atmospheric Chemistry and Physics, 18(7), 4597–4615, doi:10.5194/acp-18-4597-2018, 2018.

Grise, K.M., S.M. Davis, P.W. Staten, and O. Adam, 0: Regional and Seasonal Characteristics of the Recent Expansion of the Tropics, *J. Climate*, **31**, 6839–6856, https://doi.org/10.1175/JCLI-D-18-0060.1, 2018.

Haase, J. S., Alexander, M. J., Hertzog, A., Kalnajs, L., Deshler, T., Davis, S., Plougonven, R., Cocquerez, P. and Venel, S.: Stratéole-2 - Around the world in 84 days, *EOS,* 99, 2018.

Hassler, B., Kremser, S., Bodeker, G. E., Lewis, J., Nesbit, K., Davis, S. M., Chipperfield, M. P., Dhomse, S. S., and Dameris, M.: An updated version of a gap-free monthly mean zonal mean ozone database, Earth Syst. Sci. Data, 10, 1473-1490, https://doi.org/10.5194/essd-10-1473-2018, 2018.

Lamb, K.D., Perring, A.C., Samset, B., Peterson, D., Davis, S., Ahn, J.-Y., Anderson, B.E., Beyersdorf, A., Blake, D.R., Lamb, K. D., Perring, A. E., Samset, B., Peterson, D., Davis, S., Anderson, B. E., Beyersdorf, A., Blake, D. R., Jost, P. C., Corr, C. A., Diskin, G. S., Kondo, Y., Moteki, N., Nault, B. A., Oh, J., Park, M., Pusede, S. E., Simpson, I. J., Thornhill, K. L., Wisthaler, A. and Schwarz, J. P.: Estimating Source Region Influences on Black Carbon Abundance, Microphysics, and Radiative Effect Observed Over South Korea, J Geophys Res-Atmos, 107(15), 6699–13,548, doi:10.1029/2018JD029257, 2018.

Seviour, W. J. M., Davis, S. M., Grise, K. M., and D.W. Waugh, Large uncertainty in the relative rates of dynamical and hydrological tropical expansion. Geophysical Research Letters, 45. https://doi.org/10.1002/2017GL076335, 2018.

Staten, P.W., Lu, J., Grise, K.M., Davis, S.M., and T. Birner, Re-examining tropical expansion, *Nature Clim. Change,* 8, 768-775, 2018.

Waugh, D. W., Grise, K. M., Seviour, W. J. M., Davis, S. M., davis, N., Adam, O., Son, S. W., Simpson, I. R., Staten, P. W., Maycock, A. C., Ummenhofer, C. C., Birner, T. and Ming, A.: Revisiting the Relationship among Metrics of Tropical Expansion, J Climate, 31(18), 7565–7581, doi:10.1175/JCLI-D-18-0108.1, 2018.

Weatherhead, B., Wielicki, B.A., Ramaswamy, V., Abbott, M., Ackerman, T., Atlas, R., Brasseur, G., Bruhwiler, L., Busalacchi, A.,Butler, J.H., Clack, C.T.M., Cooke, R., Cucurull, L., Davis, S.M., English, J.M., Fahey, D.W., Fine, S.F., Lazo, J.K., Liang, S., Loeb, N.G., Rignot, E., Soden, B., Stanitski, D., Stephens, G., Tapley, B.,Thompson, A.M., Trenberth, K.E., and D. Wuebbles, Designing the Climate Observing System of the Future, Earth's Future, doi:10.1002/2017EF000627, 2018.

Weber, M., Steinbrecht, W., van der A, R., Frith, S. M., Anderson, J., Coldewey-Egbers, M., Davis, S., Degenstein, D., Fioletov, V. E., Froidevaux, L., Hubert, D., de Laat, J., Long, C. S., Loyola, D., Sofieva, V., Tourpali, K., Roth, C. Wang, R. and J. D. Wild, Stratospheric Ozone [in "State of the Climate in 2017"], *Bull. Amer. Meteor. Soc.,99(8), S51–S54, doi:10.1175/2018BAMSStateoftheClimate.1.*, 2018.

Davis, S. M., Hegglin, M. I., Fujiwara, M., Dragani, R., Harada, Y., KOBAYASHI, C., Long, C., Manney, G. L., Nash, E. R., Potter, G. L., Tegtmeier, S., Wang, T., Wargan, K. and Wright, J. S.: Assessment of upper tropospheric and stratospheric water vapor and ozone in reanalyses as part of S-RIP, Atmospheric Chemistry and Physics, 17(20), 12743–12778, doi:10.5194/acp-17-12743-2017, 2017.

Davis, S.M., Hurst, D., Rosenlof, K.H., Selkirk, H.B., and H. Vömel, Stratospheric Water Vapor [in "State of the Climate in 2016"], *Bull. Amer. Meteor. Soc.*, 98 (8), S51-S52, doi:10.1175/2017BAMSStateoftheClimate.1, 2017.

Avery, M. A., Davis, S. M., Rosenlof, K. H., Ye, H. and Dessler, A. E.: Large anomalies in lower stratospheric water vapour and ice during the 2015-2016 El Nino, *Nature Geosc*., 327, 1219, doi:10.1038/ngeo2961, 2017.

Fujiwara, M., Wright, J. S., Manney, G. L., Gray, L. J., Anstey, J., Birner, T., Davis, S., Gerber, E. P., Harvey, V. L., Hegglin, M. I., Homeyer, C. R., Knox, J. A., Krüger, K., Lambert, A., Long, C. S., Martineau, P., Molod, A., Monge-Sanz, B. M., Santee, M. L., Tegtmeier, S., Chabrillat, S., Tan, D. G. H., Jackson, D. R., Polavarapu, S., Compo, G. P., Dragani, R., Ebisuzaki, W., Harada, Y., Kobayashi, C., McCarty, W., Onogi, K., Pawson, S., Simmons, A., Wargan, K., Whitaker, J. S. and Zou, C.-Z.: Introduction to the SPARC Reanalysis Intercomparison Project (S-RIP) and overview of the reanalysis systems, *Atmos. Chem. Phys.*, 17(2), 1417–1452, doi:10.5194/acp-17-1417-2017, 2017.

Haase, J. S., Alexander, M. J., Hertzog, A., Kalnajs, L., Deshler, T., Davis, S., Plougonven, R., Cocquerez, P. and Venel, S.: Stratéole-2 - Around the world in 84 days, *EOS,* submitted.

Long, C. S., Fujiwara, M., Davis, S., Mitchell, D. M. and Wright, C. J.: Climatology and Interannual Variability of Dynamic Variables in Multiple Reanalyses Evaluated by the SPARC Reanalysis Intercomparison Project (S-RIP), *Atmos. Chem. Phys. Discuss.*, doi:10.5194/acp-2017-289, 2017.

Steinbrecht, W., Froidevaux, L., Fuller, R., Wang, R., Anderson, J., Roth, C., Bourassa, A., Degenstein, D., Damadeo, R., Zawodny, J., Frith, S., McPeters, R., Bhartia, P., Wild, J., Long, C., Davis, S., Rosenlof, K., Sofieva, V., Walker, K., Rahpoe, N., Rozanov, A., Weber, M., Laeng, A., Clarmann, T. V., Stiller, G., Kramarova, N., Godin-Beekmann, S., Leblanc, T., Querel, R., Swart, D., Boyd, I., Hocke, K., Kämpfer, N., Maillard Barras, E., Moreira, L., Nedoluha, G., Vigouroux, C., Blumenstock, T., Schneider, M., Garcìa, O., Jones, N., Mahieu, E., Smale, D., Kotkamp, M., Robinson, J., Petropavlovskikh, I., Harris, N., Hassler, B., Hubert, D. and Tummon, F.: An update on ozone profile trends for the period 2000 to 2016, Atmospheric Chemistry and Physics, 17(17), 10675–10690, doi:10.5194/acp-17-10675-2017, 2017.

Giordano, M. R., Kalnajs, L. E., Avery, A., Goetz, J. D., Davis, S. M. and DeCarlo, P. F.: A missing source of aerosols in Antarctica – beyond long-range transport, phytoplankton, and photochemistry, *Atmos. Chem. Phys.*, 17(1), 1–20, doi:10.5194/acp-17-1-2017, 2017.

Davis, S.M., Hurst, D., and K.H. Rosenlof, Stratospheric Water Vapor [in "State of the Climate in 2015"], *Bull. Amer. Meteor. Soc.*, 97 (8), S51-S53, 2016.

Davis, S. M., Rosenlof, K. H., Hassler, B., Hurst, D. F., Read, W. G., Vömel, H., Selkirk, H., Fujiwara, M., and Damadeo, R.: The Stratospheric Water and Ozone Satellite Homogenized (SWOOSH) database: a long-term database for climate studies, *Earth Syst. Sci. Data*, 8, 461-490, doi:10.5194/essd-8-461-2016, 2016.

Davis, S. M., T. Birner, and D. Seidel, How do climate variations affect the width of the tropics?, *Eos, 97,* doi:10.1029/2016EO049309, 2016.

Davis, N. A., Seidel, D. J., Birner, T., Davis, S. M., and Tilmes, S.: Changes in the width of the tropical belt due to simple radiative forcing changes in the GeoMIP simulations, *Atmos. Chem. Phys*., 16, 10083-10095, doi:10.5194/acp-16-10083-2016, 2016.

Dessler, A.E., Ye, H., Wang, T., Schoeberl, M.R., Oman, L.D., Douglass, A.R., Butler, A.H., Rosenlof, K.H., Davis, S.M., Portmann, R.W., Transport of ice into the stratosphere and the humidification of the stratosphere over the 21st century, *Geophys. Res. Lett., 42,* doi: 10.1002/2016GL067991, 2016.

Hurst, D. F., Read, W. G., Vömel, H., Selkirk, H. B., Rosenlof, K. H., Davis, S. M., Hall, E. G., Jordan, A. F., and Oltmans, S. J.: Recent divergences in stratospheric water vapor measurements by frost point hygrometers and the Aura Microwave Limb Sounder, *Atmos. Meas. Tech*., 9, 4447-4457, doi:10.5194/amt-9-4447-2016, 2016.

Solomon A., L.M Polvani, D.W. Waugh, and S.M. Davis (2016), Contrasting Upper and Lower Atmospheric Metrics of Tropical Expansion in the Southern Hemisphere*, Geophys. Res. Lett*., 43, doi:10.1002/2016GL070917, 2016.

Staten, P.W., Grise, K.M., and S.M. Davis, The Width of the Tropics: Climate Variations and Their Impacts, *SPARC Newsletter,* 2016*.*

Birner, T., Davis, S.M., and D. Seidel, Stratospheric cooling and the tropical belt Reply**,** *Phys. Today*, *68* (8), 2015.

Davis, S.M., Hurst, D., and K.H. Rosenlof, Stratospheric Water Vapor [in "State of the Climate in 2014"], *Bull. Amer. Meteor. Soc.*, 96 (7), S217–S219, 2015.

Harris, N., et al., Past changes in the vertical distribution of ozone – Part 3: Analysis and interpretation of trends, *Atmos. Chem. Phys.,*15, 9965–9982, 2015*.*

Tummon, F., Hassler, B., Harris, N., Staehlin, J., Anderson, J., Bodeker, G.E., Bourassa, A., Davis, S.M., et al., Intercomparison of vertically resolved merged satellite ozone data sets: interannual variability and long-term trends, *Atmos. Chem. Phys, 15,* 3021-3043, 2015.

Birner, T., Davis, S.M., and D. Seidel, The Changing Width of Earth's Tropical Belt, *Physics Today*, 67(12), 38, doi: 10.1063/PT.3.2620, 2014*.*

Creamean, J.M., J.R. Spackman, S.M. Davis, and A.B. White, Climatology of Long-Range Transported Asian Dust on the West Coast of the United States, *J. Geophys. Res., 119, 12,171–12,185,* doi:10.1002/ 2014JD021694, 2014.

Dessler, A.E., M.R. Schoeberl, T. Wang, S.M. Davis, K.H. Rosenlof, and J.-P. Vernier, Variations of stratospheric water vapor over the past three decades, *J. Geophys. Res.*, *119,* 12,588–12,598, doi:10.1002/2014JD021712, 2014.

Hurst, D., Davis, S.M., and K.H. Rosenlof, Stratospheric Water Vapor [in "State of the Climate in 2013"], *Bull. Amer. Meteor. Soc.*, 95 (7), S19-S20, 2014.

Hurst, D. F., Lambert, A., Read, W. G., Davis, S. M., Rosenlof, K. H., Hall, E. G., et al. Validation of Aura Microwave Limb Sounder stratospheric water vapor measurements by the NOAA frost point hygrometer*. J. Geophys. Res.*, 119(3), 1612–1625. doi:10.1002/2013JD020757, 2014.

Maycock, A. C., Joshi, M. M., Shine, K. P., Davis, S. M. and K.H. Rosenlof, The potential impact of changes in lower stratospheric water vapour on stratospheric temperatures over the last 30 years, *Q. J. Roy. Met. Soc,* 10.1002/qj.2287, 2014.

Neely, R., Marsh, D., Smith, K., Polvani, L., and S.M. Davis, Biases in Southern Hemisphere Late-Twentieth Century Climate Change Imposed by Prescribed Monthly Mean Stratospheric Ozone, *Geophys. Res. Let., 41,* doi:10.1002/2014GL06162, 2014.

Ray. E.A., Moore, F.L., Rosenlof, K.H., Davis, S.M., Sweeney, C., Tans, P. Wang, T., Elkins, J.W., Boenisch, H., Engel, A., Sugawara, S., Nakazawa, T., and S. Aoki, Improving stratospheric transport trend analysis based on SF6 and CO2 measurements, *J. Geophys. Res,* 119, 14,110–14,128, 2014.

Young, P.J., Davis, S.M., Hassler, B., Solomon, S., and K.H. Rosenlof, Modeling the climate impact of Southern Hemisphere ozone depletion: The importance of the ozone dataset, *Geophys Res. Let.,41,* doi:10.1002/2014GL061738, 2014.

Dessler, A.E., Schoeberl, M.R., Wang, T., Davis, S.M., and K.H. Rosenlof, Stratospheric water vapor feedback, *Proc. Natl. Academy Sci.*, 10.1073/pnas.1310344110, 2013.

Emanuel, K., Solomon, S., Folini, D., Davis, S.M., and C. Cagnazzo, Influence of Tropical Tropopause Layer Cooling on Atlantic Hurricane Activity*, J. Climate,* 26, 2288-2301*,* 2013.

Davis, S.M., Liang, C.K., and K.H. Rosenlof, Interannual Variability of Tropical Tropopause Layer Clouds, *Geophys. Res. Letters,* 40, 1-5*,* 2013.

Rosenlof, K.H., L. Terray, C. Deser, A. Clement, H. Goosse, S. Davis, Changes in Variability Associated with Climate Change, in Co-editor: *Climate Science for Serving Society: Research, Modelling and Prediction Priorities.* Springer Press*,* 2013, edited by G. Asrar and J. Hurrell

Evan, S., Rosenof, K.H., Dudhia, J., Hassler, B., and S.M. Davis, The representation of the TTL in a tropical channel version of the WRF model, *J. Geophys Res.,* 118, 2835–2848, doi:10.1002/jgrd.50288*,* 2013.

Davis, S.M., and K.H. Rosenlof, A multi-diagnostic intercomparison of tropical width and jet timeseries using reanalyses and satellite observations, *J. Climate,* 25, 4, 1061-1078, 2012.

Tandon, N.F., Polvani, L.M., and S.M. Davis, The response of the tropospheric circulation to water vapor-like forcings in the stratosphere, *J. Climate,* 24, 5713–5720, 2011.

Hurst, D.F., et al., Stratospheric water vapor trends over Boulder, Colorado: Analysis of the 30 year Boulder record, J. Geophys. Res., 116, D02306, doi:10.1029/2010JD015065, 2011.

Bucholtz, A., Hlavka, D.L, McGill, M.J., Schmidt K.S., Pilewskie, P., Davis, S.M., Reid, E.A., and A. L. Walker, Directly measured heating rates of a tropical subvisible cirrus cloud, *J. Geophys. Res.*, 115, doi:10.1029/2009JD013128, 2010.

Davis, S.M., et al., In situ and lidar observations of subvisible cirrus clouds during TC4, *J. Geophys. Res.*, 115, doi:10.1029/2009JD013093, 2010.

Dessler, A., and S.M. Davis, Trends in tropospheric humidity from reanalysis systems, *J. Geophys. Res*., doi:10.1029/2010JD014192, 2010.

Petropavlovskikh, I., et al., Low ozone bubbles observed in the tropical tropopause layer during the TC4 campaign in 2007, *J. Geophys. Res.,* 115, D00J16, doi:10.1029/2009JD012804, 2010.

Ray, E., et al., Evidence for Stratospheric Circulation Changes Over the Past Three Decades From Multiple Measurement Sources, J. Geophys. Res., 115, D21, doi:10.1029/2010JD014206, 2010.

Schwarz, J. P., J. R. Spackman, R. S. Gao, L. A. Watts, P. Stier, M. Schulz, S. M. Davis, S. C. Wofsy, and D. W. Fahey, Global scale black carbon profiles observed in the remote atmosphere and compared to models, *Geophys. Res. Lett*., 37, L18812, doi:10.1029/2010GL044372, 2010.

Solomon, S., Rosenlof, K., Portmann. R., Daniel, J., Davis, S.M., Sanford, T., and G. Plattner, Contributions of Stratospheric Water Vapor to Decadal Changes in the Rate of Global Warming, *Science*, 327, 1219, DOI: 10.1126/science.1182488, 2010.

Davis, S. M., L. M. Avallone, B. H. Kahn, K. G. Meyer, and D. Baumgardner, Comparison of airborne in situ measurements and Moderate Resolution Imaging Spectroradiometer (MODIS) retrievals of cirrus cloud optical and microphysical properties during the Midlatitude Cirrus Experiment (MidCiX), *J. Geophys. Res.*, 114, D02203, doi:10.1029/2008JD010284, 2009.

Davis, S.M., Airborne in situ measurements of total water using a laser hygrometer and intercomparisons with satellite observations, Ph.D. Thesis, University of Colorado, Boulder, CO, 2007.

Davis, S.M., Avallone, L.M., Weinstock, E.M., Twohy, C.H., Smith, J.B., Kok, G.L., Comparisons of in situ measurements of cirrus cloud ice water content, *J. Geophys. Res.,* 112*, doi:10.1029/2006JD008214,* 2007a.

Davis, S.M., Hallar, A.G., Avallone, L.M., and W. Englom, Measurements of Total Water Content with a Tunable Diode Laser Hygrometer: Inlet Analysis, Calibration Procedure, and Ice Water Content Determination, J. Atmos. Ocean Tech.,24, 3, 463-475, 2007b.

Lopez, J.P., Fridlind, A., Jost, H.J., Loewenstein, M., Ackerman, A.S., Campos, T., Weinstock, E.M., Sayres, D., Smith, J., Pittman, J., Hallar, A.G., Avallone, L., Davis, S., and R.L.Herman, CO signatures in subtropical convective clouds and anvils during CRYSTAL-FACE: Constraining entrainment rates with observations, *J. Geophys. Res.,* 111, D9, 2006.

Fontenla, J.M., Harder, J., Rottman, G., Woods, T.N., Lawrence, G.M., and S.M. Davis, The Signature of Solar Activity in the Infrared Spectral Irradiance, *Astrophys. J.,* 605:L85–L88, 2004.

Davis, S., Light, T.,Suszynsky, D., FORTE Observations of optical emissions from lightning: optical properties and discrimination capability , *J. Geophys. Res.*, 107, D21, 4579-4584, 2002.

Eads, D., Hill, D., Davis, S., Perkins, S., Ma, J., Porter, R., and Theiler, J., Genetic Algorithms and Support Vector Machines for Time Series Classification, Proc. SPIE 4787, 2002.

Davis, S. Object identification and tracking in a diffuse gas of granular media , Honor's Thesis, University of Tulsa, 2001.

Suszcynsky, D.M., Light, T.E., Davis, S., Green, J. L., Guillen, J.L.L, and W. Myre, Coordinated Observations of Optical Lightning from Space Using the FORTE Photodiode Detector and CCD Imager, *J. Geophys. Res.*, 106, 17,897-17,906, 2001.

SELECTED PRESENTATIONS

Davis, S.M., Progress towards improved understanding of interannual to decadal-scale variability in stratospheric water vapor, invited oral presentation, *Deutsches Zentrum für Luft- und Raumfahrt (DLR),* Oberpfaffenhofen, Germany, 18 Jun, 2018.

Davis, S.M., Rosenlof, K.H., Hurst, D.F., Hall, E.G., Jordan, A.F., and R.W. Portmann, Local measurements, global studies: The utility of balloon-borne frost point hygrometer measurements for studying global stratospheric water vapor, oral presentation, *NOAA Global Monitoring Annual Conference*, held 22 – 23 May, 2018 in Boulder, CO, 2018.

Alexander, J.M., Kalnajs, L.E., and S.M. Davis, Stratéole 2: A long duration Super Pressure Balloon Campaign to probe the Tropical Tropopause Layer, invited oral presentation, *NCAR ACOM seminar*, Boulder, CO, 9 May, 2018.

Davis, S.M., Hassler, B., and K.H. rosenlof, Do stratospheric ozone measurements show large tropical width changes?, oral presentation, *Japan Geophysical Union-American Geophysical Union Joint Meeting,* held 20 – 24 May, 2017 in Makuhari, Japan, 2017.

Davis, S.M., et al., Assessment of upper tropospheric and stratospheric water vapor and ozone in reanalyses as part of S-RIP, oral presentation, *5th International Conference on Reanalysis*, held 13 – 17 Nov., 2017 in Rome, Italy, 2016.

Davis, S.M., Rosenlof, K.H., Hassler, B., and R.W. Portmann, The Stratospheric Water and Ozone Satellite Homogenized (SWOOSH) database: A long-term database for climate studies, poster presentation, *Quadrennial Ozone Symposium*, held 4-9 Sept, 2016 in Endinburgh, U.K., 2016.

Davis, S.M., Hassler, B., and K.H. Rosenlof, Do stratospheric ozone measurements show large tropical width changes?, oral presentation, EGU General Assembly 2016, held 17-22 April, 2016 in Vienna Austria, 2016.

Davis, S.M., The water vapor content of the stratosphere: past, present, and future, Jet Propulsion Laboratory (invited), oral presentation, *NASA Jet Propulsion Laboratory*, Pasadena, CA, 2016.

Davis, S., K. Rosenlof, D. Hurst, B. Hassler, W. Read, How well can interannual to decadal-scale variability in stratospheric ozone and water vapor be quantified using limb-based satellite measurements?**,** poster presentation, AGU Fall Meeting, San Francisco, CA, 2015.

Davis, S., M. Fujiwara, The SPARC Reanalysis Intercomparison Project (S-RIP), oral presentation, *SPARC Scientific Steering Group*, Boulder, CO, 2015

Davis, S., Hegglin, M., Fujiwara, M., Manney, G., Nash,E. , Shi, L., S. Tegtmeier, T. Wang, Ozone and Water Vapour in Reanalyses, invited oral presentation, *SRIP Workshop*, Paris, France, 2015.

Davis, S., K. Rosenlof, E. Ray, Processes affecting variability of water vapor and ozone in the tropical lowermost stratosphere, invited oral presentation, *Strateole2 Workshop*, Paris, France, 2015.

Davis, S., R. Neely, D. Marsh, K. Smith, L. Polvani, K. Rosenlof, R. Portmann, Southern Hemisphere climate trends skewed by coarse temporal resolution of specified stratospheric ozone, oral presentation, *AMS Annual Meeting*, Phoenix, AZ, 2015.

Davis, S.M., Hegglin, M., Fujiwara, M., The SPARC Reanalysis Intercomparison Project (S-RIP): Comparisons of water vapor and ozone in reanalyses, oral presentation, S-RIP meeting, NOAA Center for Weather and Climate Prediction, Greenbelt, MD, 2014.

Davis, S.M., Modeling the impact of late 20th century stratospheric ozone changes: Sensitivity to ozone forcing data sets and zonal asymmetry, oral presentation, Fall AGU meeting, Dec. 12,2013.

Davis, S.M., Rosenlof, K.H, and B. Hassler, The Stratospheric Water and OzOne Satellite Homogenized (SWOOSH) database, poster, SI^{2}N Workshop on Past Changes in the Vertical Distribution of Ozone, Sep 18-19, 2013.

Davis, S.M., Liang, C.K., and K.H. Rosenlof, Interannual variability of tropical tropopause layer clouds, oral presentation, NCAR TTL mini-workshop, July 16, 2013.

Davis, S.M., Liang, C.K., and K.H. Rosenlof, Interannual variability of tropical tropopause layer clouds, invited seminar, Colorado State University, June, 2013.

Davis, S.M., and M.I. Hegglin, S-RIP Water Vapor and Ozone Chapter report, invited oral presentation, SPARC Reanalysis Intercomparison Project (S-RIP) planning meeting, Exeter, UK, May 29-June 1, 2013.

Davis, S.M., and K.H. Rosenlof, Variability and trends in effective diffusivity in reanalyses, SPARC Reanalysis Intercomparison Project (S-RIP) planning meeting, Exeter, UK, May 29-June 1, 2013.

Davis, S.M., and K.H. Rosenlof, The Stratospheric Water and Ozone Satellite Homogenized (SWOOSH) database: A long-term database for climate studies and assessment of reanalyses, poster, SPARC Reanalysis Intercomparison Project (S-RIP) planning meeting, Exeter, UK, May 29-June 1, 2013.

Davis, S.M., Ozone depletion, greenhouse gasses, and “tropical widening”, invited seminar, Lancaster University, April 24, 2013.

Davis, S.M., Young, P.J., Neely, R.R., Hassler, B., and K. H. Rosenlof, Modeling the impact of late 20th century stratospheric ozone changes: sensitivity to different ozone forcing datasets, poster, WCRP Workshop on the Climatic Effects of Ozone Depletion in the Southern Hemisphere: Assessing the Evidences and Identifying the Gaps in Current Knowledge, Buenos Aires, Argentina, Feb. 25 – March 1, 2013.

Davis, S.M., Rosenlof, K.H., and P.J. Young, Tropical widening in models, reanalyses, and satellite observations, Fall AGU Meeting, 2012.

Davis, S.M., Rosenlof, K.H., and B. Hassler, The Stratospheric Water and OzOne Satellite Homogenized (SWOOSH) database, Workshop on Past Changes in the Vertical Distribution of Ozone, Columbia, MD, 2012.

Davis, S.M., Young, P.J., and K.H. Rosenlof, A multi-diagnostic intercomparison of tropical width time series using models, reanalyses, and satellite observations, SPARC Data Assimilation Workshop, Socorro, NM, 2012.

Davis, S.M., Ray, E., and K.H. Rosenlof, Variability and trends in effective diffusivity from reanalysis, and their implications for stratospheric circulation changes, SPARC Data Assimilation Workshop, Socorro, NM., 2012.

Davis, S.M., Young, P.J., Portmann, R.W., and K.H. Rosenlof, Stratospheric water vapor representation in coupled models and implications for feedback processes, American Geophysical Union, Fall Meeting, A42B-03., 2011.

Davis, S.M., and K.H. Rosenlof, A multi-diagnostic intercomparison of tropical width and jet timeseries using meteorological reanalyses and satellite observations, WCRP Open Science Conference, C22, T264B, 2011.

Davis, S.M., and K.H. Rosenlof, Progress towards a merged satellite upper tropospheric and stratospheric humidity data set for studying decadal-scale water vapor changes, WCRP Open Science Conference, C15, T98A, 2011.

Davis, S.M., Towards an improved understanding of tropical widening, NOAA ESRL Chemical Sciences Division seminar, 2011.

Davis, S.M., Ray, E.A., and K.H. Rosenlof, Variability and trends in effective diffusivity in the stratosphere, and their implications for stratospheric circulation changes, 16th Conference on the Middle Atmosphere, 2011.

Davis, S.M., and K.H. Rosenlof, A multi-diagnostic intercomparison of tropical width timeseries using meteorological reanalyses and satellite observations, American Geophysical Union, Fall Meeting 2010, abstract #A33A-0123, 2010.

Davis, S.M., and K.H. Rosenlof, Progress towards a merged satellite upper tropospheric and stratospheric water vapor data set and its use in assessing the radiative impact of water vapor changes, Aura Science Team Meeting, Boulder, CO, 2010.

Davis, S.M., and K.H. Rosenlof, Changes in the tropical belt and their effect on trace gas distributions in the UTLS, EGU General Assembly, Vienna, Austria, p.5527, 2010.

Davis, S.M., Rosenlof, K.H., and E.A. Ray, Variability and Trends in Effective Diffusivity in the Stratosphere, EGU General Assembly, Vienna, Austria, p.5533, 2010.

Davis, S.M., and K.H. Rosenlof, Changes in the tropical belt and their effect on trace gas distributions in the UTLS, American Geophysical Union, Fall Meeting 2009, abstract #A31D-0131, 2009.

Davis, S.M., and L.M. Avallone, CLH Ice Water Content Measurements during TC^4, TC^4 Science Team Meeting, Virginia Beach, VA, 2008.

Davis, S.M., Kahn, B., Avallone, L.M., and K.G. Meyer, Direct comparisons between AIRS and MODIS cirrus retrievals and WB-57 in situ measurements from MidCiX, TC^4 Science Team Meeting, Virginia Beach, VA, 2008.

Davis, S.M., Jensen, E., Baumgardner, D., Hlavka, D., Lawson, P., and L.M. Avallone, In Situ Measurements of Subvisual Cirrus Microphysical Properties from the WB-57, TC^4 Science Team Meeting, Virginia Beach, VA, 2008.

Davis, S.M., Avallone, L.M., Jensen, E., and D. Baumgardner, In Situ Measurements of Subvisual Cirrus from the WB-57 Aircraft During TC4, *Eos Trans. AGU, 88*(52), Fall Meet. Suppl., A13C-1359, 2007.

Davis, S.M., Avallone, L.M., Kahn, B., Meyer, K., Zhang, Z., and Q. Yue, Comparison of In Situ and AIRS/MODIS Measurements of Cirrus Microphysical and Radiative Properties, 14th Conference on the Middle Atmosphere, AMS, Portland, OR, 2007.

Davis, S.M., Avallone, L.M., Toohey, D., and M. Ross, Rocket Exhaust Plume Measurements and Their Potential Use in Constraining the Accuracy of Water Vapor Measurements, International Workshop on Upper Tropospheric Relative Humidity, Karlsruhe, Germany, 2007.

Davis, S.M., Avallone, L.M., Hallar, A.G., and W. Engblom, Comparison of In situ Measurements of Cirrus Cloud Ice Water Content during the MidCiX Field Campaign, *Eos Trans. AGU, 86*(52), Fall Meet. Suppl., A13C-0947, 2005.

Davis, S., Fontenla, J., Harder, J., Rottman, G., and R. Meisner, Modeling solar irradiance with PSPT solar disk observations and RISE solar spectrum synthesis, *Eos Trans. AGU, 84*(46), Fall Meet. Suppl., SH22-1159, 2003.

Davis, S.M., Suszcynsky, D.M., Heavner, M.J., Jacobson, A., and T.E. Light, FORTE Observations of Simultaneous VHF and Optical Emissions From Lightning: Optical Source Properties and Discrimination Capability, *Eos Trans. AGU, 82*(47), Fall Meet. Suppl., AE11A-0057, 2001.

FIELD EXPERIENCE

2ODIAC (2 Season Ozone Depletion, Ice, Aerosol Campaign), McMurdo Station, Antarctica, October – November 2014:

- Operated aerosol and meteorological instrumentation at a remote field site and provided meteorological support

START08 (Stratosphere-Troposphere Analyses of Regional Transport), Boulder, CO, April-June 2008:

- Operated the closed-path laser hygrometer (CLH) total water instrument aboard the NCAR Gulfstream-V aircraft

AquaVIT (Aqua Validation and Instrument Tests), Karlsruhe, Germany, October 2007:

- Operated the CLH instrument in a water vapor intercomparison experiment at the AIDA aerosol chamber

TC^4 (Tropical Composition Cloud and Climate Coupling), San Jose, Costa Rica, July-August 2007:

- Operated the CLH instrument aboard the NASA WB-57 aircraft

PUMA (Plume Ultrafast Measurements and Acquisition), Cape Canaveral, Florida, December 2006:

- Operated instruments for trace gas measurements in the space shuttle exhaust from aboard the NASA WB-57

Winfly, McMurdo Station, Antarctica, August - November 2004:

- Developed instrumentation, planned, and acquired measurements of atmospheric chemistry and snowpack properties from a remote field site
- Participated in numerous ozonesonde and larger-payload balloon launches, tracking, and recovery

MidCiX (Midlatitude Cirrus Experiment), Houston, Texas, April-May 2004:

- Operated the CLH instrument as part of a suite of cloud instruments flown aboard the NASA WB-57 aircraft