

Curriculum Vitae

Judith Perlwitz

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Research Interests:

Climate diagnostics, atmospheric dynamics, dynamical interaction between troposphere and stratosphere, role of the stratosphere in climate and climate change, chemistry climate interactions, climate attribution and attribution of extreme events

Professional Preparation

1993 Diploma, (German equivalent to M. Sc.) Humboldt University, Berlin, Germany
2000 Ph.D, Hamburg University, Hamburg, Germany

Appointments

- November 2014-present Intergovernmental Personnel Act appointment with NOAA and NOAA Team Lead of NOAA/ESRL/PSD's Team on Attribution and Predictability Assessments
- 2015-present Senior Research Scientist
- 2009-2014 Research Scientist III, University of Colorado, Boulder
- 2005-2009 Research Scientist II, University of Colorado, Boulder
- 2002-2005 Associate Research Scientist, Columbia University, New York, NY
- 2000-2002 Postdoctoral Research Scientist, Columbia University, New York, NY
- 1996-1999 Research Scientist, Max-Planck Institute for Meteorology, Hamburg, Germany
- 1993-1995 Research Assistant, Max-Planck Institute for Meteorology, Hamburg, Germany

Honors and Awards

American Meteorological Society, Fellow (2016)

Professional Activities

- Lead Author U.S. Global Change Research Program (USGCRP) Climate Science Special Report (CSSR)
- WCRP/SPARC Co-chair (since 2016)
- Editor, Journal of Climate, American Meteorological Society (2013-2016)
- Review Editor and Contributing Author, WMO/UNEP Assessment of Ozone Depletion 2014

- Fellow, Cooperative Institute for Research in Environmental Sciences, University of Colorado (since 2011)
- Lead Author, IPCC AR5 WG1 Lead Author Chapter 10, Contributing Author Chapter 9
- Contributing Author, Summary for Policy makers, IPCC AR5 WG1
- WMO/UNEP Assessment of Ozone Depletion 2010 Contributing Author. Chapter 3
- Coordinator of WCRP SPARC DynVar project 2007-2011
- Member AMS Middle Atmosphere Committee 2007-2011
- Co-organizer 40th NOAA Climate Diagnostics and Prediction Workshop in 2015
- Convener of international workshops and conference sessions (AGU, SPARC DynVar Workshop, AGU Chapman Conference)
- Member of proposal review panels for USAID, NASA, NOAA and German Federal Ministry of Education

Grant Awards

- Perlwitz, J, 2016: Role of stratospheric processes in predicting ENSO-NAO connections on subseasonal time scale (NOAA-CPO), 255K, 3 years.
- Zhang, T., M. Hoerling and J. Perlwitz, 2014: Toward Improving ENSO Modeling (NOAA-CPO), 287K, 3 years.
- Perlwitz et al. 2013: Interactions of Stratospheric Ozone with Northern Hemisphere Tropospheric Climate (NASA), CIRES: 484K, 4 years
- Long et al. 2013: Strategies to Improve Stratospheric Processes in Climate Reanalysis, (NOAA), CIRES PI: J Perlwitz, 121K, 3 years.
- Perlwitz. J. et al., 2009: CFS Stratosphere Improvements (NOAA), 580K, 3 years
- Stolarski R. et. al 2005: Chemistry Climate Studies Using General Circulation Models (NASA), CIRES PI J. Perlwitz, 280K, 5 years.
- Perlwitz, J. 2004: Observational constraints on modeling the dynamic troposphere-stratosphere coupling (NASA), 301K, 3 years.
- Graf H.-F. and J. Perlwitz, 2000: Process-oriented validation of atmospheric circulation models. Atmospheric Research Program, BMBF Germany, 3 years.
- Graf, H.-F., J. Perlwitz and C. Timmreck, 1996: Modeling and interpretation of variations of the stratospheric ozone - Separation of chemical and dynamical effects, Ozone Research Program, BMBF Germany, 3 years.

Publications

- 75) Sun, L., **J. Perlwitz**, and M. Hoerling, 2016: What caused the recent “Warm Arctic, Cold Continents” trend pattern in winter temperatures?, *Geophys. Res. Lett.*, 43, 5345–5352, doi:10.1002/2016GL069024.
- 74) Zhang, T, M.P. Hoerling, **J. Perlwitz** and T. Xu, 2016: Forced Atmospheric Teleconnections During 1979-2014. *J. Climate*, 29, 2333-2357.
- 73) Hoerling, M., J. Eischeid, J. Perlwitz, X. Quan, K. Wolter, and L. Cheng, 2016: Characterizing Recent Trends in U.S. Heavy Precipitation, *J. Climate*, 29, 2313-2332.
- 72) Li, F., Y. Vikhliayev, P. Newman, S. Pawson, **J. Perlwitz**, D. Waugh, and A. Douglass, 2016: Impacts of Interactive Stratospheric Chemistry on Antarctic and Southern Ocean

- Climate Change in the Goddard Earth Observing System, Version 5 (GEOS-5). *J. Climate*, 29, 3199–3218, doi: 10.1175/JCLI-D-15-0572.1.
- 71) Hoell, A., M. Hoerling, J. Eischeid, K. Wolter, R. Dole, **J. Perlwitz**, T. Xu and L. Cheng, 2016: Does El Niño intensity matter for California precipitation?. *Geophysical Research Letters*, doi: 10.1002 / 2015GL0 67102.
- 70) **Perlwitz, J.**, M. Hoerling, and R. Dole, 2014: Arctic Tropospheric Warming: Causes and Linkages to Lower Latitudes. *J. Climate*. doi:10.1175/JCLI-D-14- 00095.1, in press.
- 69) Smith, A.K., and **J. Perlwitz**, 2015. Planetary Waves. In: Gerald R. North (editor-in-chief), John Pyle and Fuqing Zhang (editors). *Encyclopedia of Atmospheric Sciences*, 2nd edition, Vol 4, pp. 1-11.
- 68) Assessment for Decision-Makers: Scientific Assessment of Ozone Depletion (**J. Perlwitz**, Coauthor): 2014, World Meteorological Organization, Global Ozone Research and Monitoring Project-Report No. 56, Geneva, Switzerland, 2014 .
- 67) Hoerling, M., K. Wolter, **J. Perlwitz**, X. Quan, J. Eischeid, H. Wang, S. Schubert, H. Diaz, and R. Dole, Northeast Colorado extreme rains interpreted in a climate change context. [in "Explaining Extremes of 2013 from a Climate Perspective"]. *Bull. Amer. Meteor. Soc.*, 95, S15-S18.
- 66) Shaw, T. A., **J. Perlwitz**, and O. Weiner, 2014: Troposphere-stratosphere coupling: Links to North Atlantic weather and climate, including their representation in CMIP5 models, *J. Geophys. Res. Atmos.*, 119, doi:10.1002/2013JD021191.
- 65) Karpechko, A., J. Perlwitz and E. Manzini, 2014: A model study of tropospheric impacts of the Arctic ozone depletion 2011, *J. Geophys. Res.*, 19,7999-8014, doi: 10.1002/2013JD021350.
- 64) Zhang, T., **J. Perlwitz**, and M. P. Hoerling (2014), What is responsible for the strong observed asymmetry in teleconnections between El Nino and La Nina?, *Geophys. Res. Lett.*, 41, doi:10.1002/2013GL058964.
- 63) Quan, X.W., M. Hoerling, **J. Perlwitz**, and H.F. Diaz, 2014: Expansion of the Subtropical Dry Zones and the Hadley Cell, *J. Climate*, 27, 1999-2013.
- 62) Bindoff, N.L., P.A. Stott, K.M. AchutaRao, M.R. Allen, N. Gillett, D. Gutzler, K. Hansingo, G. Hegerl, Y. Hu, S. Jain, I.I. Mokhov, J. Overland, J. Perlwitz, R. Sebbari and X. Zhang, 2013: Detection and Attribution of Climate Change: from Global to Regional. In: *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.
- 61) Shaw, T. A. and **J. Perlwitz**, 2014: On the control of the residual circulation and stratospheric temperatures in the Arctic by planetary wave reflection, *J. Atmos. Sci.* 71, 195-206.
- 60) Dole, R., M. Hoerling, A. Kumar, J. Eischeid, **J. Perlwitz**, X. W. Quan, G. Kiladis, R. Webb, D. Murray, M. Chen, K. Wolter and T. Zhang, 2014: The Making of An Extreme Event: Putting the Pieces Together, *Bull. Amer. Meteor. Soc.*, 95,427-440.
- 59) Stott, P. A., M. Allen, N. Christidis, R. M. Dole, M. Hoerling, C. Huntingford, P. Pall, J. **Perlwitz**, and D. Stone, 2013: Attribution of weather and climate-related events. In: *Climate Science for Serving Society: Research, Modeling and Prediction Priorities*, Eds. G. R. Asrar, J. W. Hurrell, Springer Science+Business Media, Dordrecht 307-337.

- 58) Eyring, V., I. Cionni, J. Arblaster, J. Sedlacek, **J. Perlwitz**, P. Young, S. Bekki, D. Bergmann, P. Cameron-Smith, W. Collins, G. Faluvegi, K.-D. Gottschaldt, L. Horowitz, D. Kinnison, J.-F. Lamarque, D. R. Marsh, D. Saint-Martin, D. Shindell, K. Sudo, S. Szopa, S. Watanabe, 2013: Long-term changes in tropospheric and stratospheric ozone and associated climate impacts in CMIP5 simulations, *J. Geophys. Res. Atmos.*, 118,5029-5060,doi:10.1002/jgrd.50316.
- 57) Lott, F., P. A. Stott, D. Mitchell, N. Christidis, N. Gillett, L. Gray, L. Haimberger, **J. Perlwitz**, P. Thorne, 2013: Models versus Radiosondes in the Free Atmosphere: A New Detection And Attribution Analysis of Temperature, *J. Geophys. Res. Atmos.* 118,2609-2619. doi: 10.1002/jgrd.50255.
- 56) Santer, B. D., J. Painter, C. Mears, C. Doutriaux, P. Caldwell, J.M. Arblaster, P. Cameron-Smith, N.P. Gillett, P.J. Gleckler, J.R. Lanzante, **J. Perlwitz**, S. Solomon, P.A. Stott, K.E. Taylor, L. Terray, P.W. Thorne, M.F. Wehner, F.J. Wentz, T.M.L. Wigley, L. Wilcox, and C.-Z. Zou, 2013: Identifying human influences on atmospheric temperature, *Proc. Natl. Acad. Sci. U.S.A.*, 110, 26-33,doi:10.1073/pnas.1210514109.
- 55) Hoerling, M., A. Kumar, R. Dole, J. W. Nielsen-Gammon, J. Eischeid, **J. Perlwitz**, X. Quan, T. Zhang, P. Pegion, and M. Chen, 2013: Anatomy of an extreme event, *J. Climate*, 26, 2811-2832
- 54) Shaw, T. A. and J. Perlwitz, 2013: The life cycle of Northern Hemisphere downward wave coupling, *J. Climate*, 26,1745-1763.
- 53) Gerber, E. P., A. Butler, N. Calvo, A. Charlton-Perez, M. Giorgetta, E. Manzini, J. Perlwitz, L. M. Polvani, F. Sassi, A. Scaife, T. Shaw, S.-W. Son, and S. Watanabe, 2011: Assessing and Understanding the Impact of Stratospheric Dynamics and Variability on the Earth System, *Bull. Amer. Meteor. Soc.*,93,845-859.
- 52) Galarneau, T.J. Jr, T. M. Hamill, R. M. Dole and **J. Perlwitz**, 2011: A Multi-Scale Analysis of the Extreme Weather Events over Western Russia and Northern Pakistan During July 2010. *Mon. Wea Rev.*, 140, 1639-1664.
- 51) Hoerling, M., J. Eischeid, **J. Perlwitz**, X.-W. Quan, T. Zhang, P. Pegion: On the Increased Frequency of Mediterranean Drought, (2012), *J. Climate*, 25, 2146-2161.
- 50) McLandress, C., **J. Perlwitz** and T.G. Shepherd: Comment on "Tropospheric temperature response to stratospheric ozone recovery in the 21st century" by Hu et al. , 2011; *Atmos. Chem. Phys.*, 12, 2533-2540, doi:10.5194/acp-12-2533-2012.
- 49) Hoerling, M., E. Easterling, **J. Perlwitz**, J. Eischeid, P. Pegion, and D. Murray, 2011: An Assessment of 2010 North America Temperatures,. In:State of the climate in 2010, *Bull. Amer. Meteor. Soc*, S178-S179.
- 48) Zhang, T., M. P. Hoerling, **J. Perlwitz**, D.-Z. Sun and D. Murray, 2011: Physics of U.S. surface temperature response to ENSO forcing, *J. Climate*, 24,4874-4887.
- 47) Harnik, N., **J. Perlwitz**, and T. A. Shaw, 2011: Observed decadal changes in downward wave coupling between the stratosphere and troposphere in the Southern Hemisphere, *J. Climate*, 24,4558-4569.
- 46) Shaw, T. A., **J. Perlwitz**, N. Harnik, P. A. Newman and S. Pawson, 2011: The impact of stratospheric ozone changes on downward wave coupling in the Southern Hemisphere. *J. Climate*, 24,4210-4229.
- 45) **Perlwitz J.**,2011: Atmospheric science: Tug of war on the jet stream. *Nature Climate Change*,1, 29-31, doi:10.1038/nclimate1065.

- 44) Dole, R., M. Hoerling, **J. Perlwitz**, J. Eischeid, P. Pegion, T. Zhang, X.-W. Quan, T. Xu, and D. Murray (2011), Was there a basis for anticipating the 2010 Russian heat wave?, *Geophys. Res. Lett.*, 38, L06702, doi:10.1029/2010GL046582.
- 43) Butchart, N. A. J. Charlton-Perez, I. Cionni, S. C. Hardiman, P. H. Haynes, K. Kruger, P. Kushner, P. A. Newman, S. M. Osprey, **J. Perlwitz**, F. Sassi, M. Sigmond, L. Wang, H. Akiyoshi, J. Austin, S. Bekki, A. Baumgartner, P. Braesicke, C. Bruhl, M. Chipperfield, M. Dameris, S. Dhomse, V. Eyring, R. Garcia, H. Garny, P. Joeckel, J.-F. Lamarque, M. Marchand, M. Michou, O. Morgenstern, T. Nakamura, S. Pawson, D. Plummer, J. Pyle, E. Rozanov, J. Scinocca, T. G. Shepherd, K. Shibata, D. Smale, H. Teyssedre, W. Tian, D. Waugh, and Y. Yamashita, 2010: Multi-model climate and variability of the stratosphere, *J. Geophys. Res.*, 116, D05102, doi:10.1029/2010JD014995.
- 42) Shaw, T. A., **J. Perlwitz** and N. Harnik, 2010: Downward wave coupling between the stratosphere and troposphere: the importance of meridional wave guiding and comparison with zonal-mean coupling, *J. Climate*, 23, 6365-6381.
- 41) Kumar, A., **J. Perlwitz**, J. Eischeid, X. Quan, T. Xu, T. Zhang, M. Hoerling, B. Jha, W. Wang, 2010: Contribution of Sea Ice Loss to Arctic Amplification, *Geophys. Res. Lett.*, 37, L21701, doi:10.1029/2010GL045022.
- 40) Son, S.-W., E. Gerber, **J. Perlwitz**, L. Polvani, N. Gillett, K.-H. Seo, V. Eyring, T. G. Shepherd, D. Waugh, H. Akiyoshi, J. Austin, A. Baumgaertner, S. Bekki, P. Braesicke, C. Bruehl, N. Butchart, M. Chipperfield, D. Cugnet, M. Dameris, S. Dhomse, S. Frith, H. Garny, R. Garcia, S. Hardiman, P. Jaekel, J.-F. Lamarque, E. Mancini, M. Marchand, M. Michou, T. Nakamura, O. Morgenstern, G. Pitari, D. Plummer, J. Pyle, E. Rozanov, J. Scinocca, K. Shibata, D. Smale, H. Teyssedre, W. Tian, Y. Yamashita, 2010: The Impact of Stratospheric Ozone on the Southern Hemisphere Circulation Changes: A Multimodel Assessment, *J. Geophys. Res.*, 115, D00M07, doi:10.1029/2010JD014271.
- 39) Butchart N., A. J. Charlton-Perez, I. Cionni, S.C. Hardiman, K. Krueger, P. Kushner, P. Newman, S. M. Osprey, **J. Perlwitz**, F. Sassi, M. Sigmond, and L. Wang, 2010: SPARC CCMVal Report on the Evaluation of Chemistry-Climate Models: Dynamics, Eds. V. Eyring, T. G. Shepherd, D. W. Waugh, SPARC Report No. 5, WCRP132, WMO/TD-No. 1526.
- 38) Li, S., **J. Perlwitz**, M. P. Hoerling, and X. Chen, 2010: Opposite annular responses of the Northern and Southern Hemisphere to Indian Ocean warming, *J. Climate*, 23, 3720-3738.
- 37) Shaw, T. A. and **J. Perlwitz**, 2010: The impact of stratospheric model configuration on planetary scale waves in northern hemisphere winter, *J. Climate*, 23, 3369-3389.
- 36) Hoerling, M. J. Eischeid, and **J. Perlwitz**, 2010: Regional Precipitation Trends: Distinguishing Natural Variability from Anthropogenic Forcing, *J. Climate*, 23, 2131-2145.
- 35) **Perlwitz, J.**, M. Hoerling, J. Eischeid, T. Xu, and A. Kumar (2009), A strong bout of natural cooling in 2008, *Geophys. Res. Lett.*, 36, L23706, doi:10.1029/2009GL041188.
- 34) Fogt, R.L., **J. Perlwitz**, A.J. Monaghan, D.H. Bromwich, J.M. Jones, and G.J. Marshall, 2009: Historical SAM Variability. Part II: Twentieth-Century Variability and Trends from Reconstructions, Observations, and the IPCC AR4 Models. *J. Climate*, 22, 5346-5365.

- 33) Waugh, D. W., L. Oman, P. A. Newman, R. S. Stolarski, S. Pawson, J. E. Nielsen, and **J. Perlwitz**, 2009: Effect of zonal asymmetries in stratospheric ozone on simulated Southern Hemisphere climate trends, *Geophys. Res. Lett.*, 36, L18701, doi:10.1029/2009GL040419.
- 32) Fogt, R. L., **J. Perlwitz**, S. Pawson, and M. A. Olsen (2009), Intra-annual relationships between polar ozone and the SAM, *Geophys. Res. Lett.*, 36, L04707, doi:10.1029/2008GL036627.
- 31) Kushner, P. J., M. A. Giorgetta, E. Manzini, **J. Perlwitz**, L. M. Polvani, and F. Sassi, 2008: SPARC Dynamics and Variability Project (DynVar): Plans and Status. SPARC Newsletter, 32, 13-16.
- 30) Neff, W., **J. Perlwitz**, and M. Hoerling (2008), Observational evidence for asymmetric changes in tropospheric heights over Antarctica on decadal time scales, *Geophys. Res. Lett.*, 35, L18703, doi:10.1029/2008GL035074.
- 29) **Perlwitz, J.**, S. Pawson, R. L. Fogt, J. E. Nielsen, and W. D. Neff (2008), Impact of stratospheric ozone hole recovery on Antarctic climate, *Geophys. Res. Lett.*, 35, L08714, doi:10.1029/2008GL033317.
- 28) Li, S., **J. Perlwitz**, X. Quan, and M. P. Hoerling (2008), Modelling the influence of North Atlantic multidecadal warmth on the Indian summer rainfall, *Geophys. Res. Lett.*, 35, L05804, doi:10.1029/2007GL032901.
- 27) Baldwin, M., D. W. J. Thompson, E. F. Shuckburgh, B. Christiansen, M. Dameris, N. P. Gillett, L. J. Gray, P. H. Haynes, P. J. Kushner, W. A. Norton, **J. Perlwitz**, T. G. Shepherd, and S. Yoden (2008), Report on the Chapman Conference: "The Role of the Stratosphere in Climate and Climate Change", 24-28 September 2007, Santorini, Greece, SPARC Newsletter, 31, 9-14.
- 26) Kushner, P. J., J. Austin, M. P. Baldwin, N. Butchart, M. A. Giorgetta, P. H. Haynes, E. Manzini, N. A. McFarlane, A. O'Neill, **J. Perlwitz**, L. M. Polvani, W. A. Robinson, F. Sassi, J. F. Scinocca, T. G. Shepherd (2007): The SPARC DynVar Project: A SPARC Project on the Dynamics and Variability of the Coupled Stratosphere-Troposphere System, SPARC Newsletter, 29, 9-14.
- 25) Charlton A.J., L.M. Polvani, **J. Perlwitz**, F. Sassi, E. Manzini, S. Pawson, J.E. Nielsen, K. Shibata and D. Rind (2007): A new look at stratospheric sudden warmings. Part II. Evaluation of numerical model simulations, *J. Climate*, 20, 470-488.
- 24) Hansen, J., Mki. Sato, R. Ruedy, P. Kharecha, A. Lacis, R.L. Miller, L. Nazarenko, K. Lo, G.A. Schmidt, G. Russell, I. Aleinov, S. Bauer, E. Baum, B. Cairns, V. Canuto, M. Chandler, Y. Cheng, A. Cohen, A. Del Genio, G. Faluvegi, E. Fleming, A. Friend, T. Hall, C. Jackman, J. Jonas, M. Kelley, N.Y. Kiang, D. Koch, G. Labow, J. Lerner, S. Menon, T. Novakov, V. Oinas, J. Perlwitz, **J. Perlwitz**, D. Rind, A. Romanou, R. Schmunk, D. Shindell, P. Stone, S. Sun, D. Streets, N. Tausnev, D. Thresher, N. Unger, M. Yao, and S. Zhang, 2007: Climate simulations for 1880-2003 with GISS modelE. *Clim. Dynam.*, 29, 661-696, doi:10.1007/s00382-007-0255-8.
- 23) Hansen, J., Mki. Sato, R. Ruedy, P. Kharecha, A. Lacis, R.L. Miller, L. Nazarenko, K. Lo, G.A. Schmidt, G. Russell, I. Aleinov, S. Bauer, E. Baum, B. Cairns, V. Canuto, M. Chandler, Y. Cheng, A. Cohen, A. Del Genio, G. Faluvegi, E. Fleming, A. Friend, T. Hall, C. Jackman, J. Jonas, M. Kelley, N.Y. Kiang, D. Koch, G. Labow, J. Lerner, S. Menon, T. Novakov, V. Oinas, J. Perlwitz, **J. Perlwitz**, D. Rind, A. Romanou, R. Schmunk, D. Shindell, P. Stone, S. Sun, D. Streets, N. Tausnev, D. Thresher, N. Unger, M. Yao, and S. Zhang 2007.

- Dangerous human-made interference with climate: A GISS modelE study. *Atmos. Chem. Phys.*, 7, 2287-2312. 2006
- 22) Schmidt, G.A., R. Ruedy, J.E. Hansen, I. Aleinov, N. Bell, M. Bauer, S. Bauer, B. Cairns, V. Canuto, Y. Cheng, A. Del Genio, G. Faluvegi, A.D. Friend, T.M. Hall, Y. Hu, M. Kelley, N.Y. Kiang, D. Koch, A.A. Lacis, J. Lerner, K.K. Lo, R.L. Miller, L. Nazarenko, V. Oinas, J. Perlwitz, **J. Perlwitz**, D. Rind, A. Romanou, G.L. Russell, Mki. Sato, D.T. Shindell, P.H. Stone, S. Sun, N. Tausnev, D. Thresher, and M.-S. Yao 2006. Present day atmospheric simulations using GISS ModelE: Comparison to in-situ, satellite and reanalysis data. *J. Climate* 19, 153-192.
 - 21) Hansen, J., M. Sato, R. Ruedy, L. Nazarenko, A. Lacis, G.A. Schmidt, G. Russell, I. Aleinov, M. Bauer, S. Bauer, N. Bell, B. Cairns, V. Canuto, M. Chandler, Y. Cheng, A. Del Genio, G. Faluvegi, E. Fleming, A. Friend, T. Hall, C. Jackman, M. Kelley, N. Kiang, D. Koch, J. Lean, J. Lerner, K. Lo, S. Menon, R. Miller, P. Minnis, T. Novakov, V. Oinas, J. Perlwitz, **J. Perlwitz**, D. Rind, A. Romanou, D. Shindell, P. Stone, S. Sun, N. Tausnev, D. Thresher, B. Wielicki, T. Wong, M. Yao, and S. Zhang 2005. Efficacy of climate forcings. *J. Geophys. Res.* 110, D18104, doi:10.1029/2005JD005776.
 - 20) Hansen, J., L. Nazarenko, R. Ruedy, Mki. Sato, J. Willis, A. Del Genio, D. Koch, A. Lacis, K. Lo, S. Menon, T. Tsvakov, **J. Perlwitz**, G. Russell, G.A. Schmidt, and N. Tausnev 2005. Earth's energy imbalance: Confirmation and implications. *Science* 308, 1431-1435, doi:10.1126/science.1110252.
 - 19) Harnik, N., R.K. Scott, and **J. Perlwitz** 2005. Wave reflection and focusing prior to the major stratospheric warming of September 2002. *J. Atmos. Sci.* 62, 640-650, doi:10.1175/JAS-3327.1.
 - 18) Rind, D., **J. Perlwitz**, and P. Lonergan 2005. AO/NAO response to climate change: 1. Respective influences of stratospheric and tropospheric climate changes. *J. Geophys. Res.* 110, D12107, doi:10.1029/2004JD005103.
 - 17) Rind, D., **J. Perlwitz**, P. Lonergan, and J. Lerner 2005. AO/NAO response to climate change: 2. Relative importance of low and high latitude temperature changes. *J. Geophys. Res.* 110, D12108, doi:10.1029/2004JD005686. 2004
 - 16) **Perlwitz, J.**, and N. Harnik 2004. Downward coupling between the stratosphere and troposphere: The relative roles of wave and zonal mean processes. *J. Climate* 17, 4902-4909, doi:10.1175/JCLI-3247.1.
 - 15) Rind, D., and **J. Perlwitz** 2004. The response of the Hadley circulation to climate changes, past and future. In *The Hadley Circulation: Past, Present and Future* (H.F. Diaz and R.S. Bradley, Eds.), *Advances in Global Change Research*, Vol. 21, pp. 399-435. Springer Verlag. Berlin.
 - 14) Rind, D., D. Shindell, **J. Perlwitz**, J. Lerner, P. Lonergan, J. Lean, and C. McLinden 2004. The relative importance of solar and anthropogenic forcing of climate change between the Maunder Minimum and the present. *J. Climate* 17, 906-929, doi:10.1175/1520-0442(2004)017<0906:TRIOSA>2.0.CO;2. 2003
 - 13) **Perlwitz, J.**, and N. Harnik 2003. Observational evidence of a stratospheric influence on the troposphere by planetary wave reflection. *J. Climate* 16, 3011-3026. 2002
 - 12) Rind, D., J. Lerner, **J. Perlwitz**, C. McLinden, and M. Prather 2002. Sensitivity of tracer transports and stratospheric ozone to sea surface temperature patterns in the doubled CO₂ climate. *J. Geophys. Res.* 107, no. D24, 4800, doi:10.1029/2002JD002483. 2001

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- 9) Graf, H.-F. and **J. Perlwitz**, 2001: Changing stratospheric circulation, the greenhouse effect and ozone loss. in: G.Beig (Ed.), *Long Term Changes and Trends in the Atmosphere*, New Age Intl. limited, Publishers, New Delhi, Bangalore, Calcutta, Chennai, Guwahati, Hyderabad, Lucknow, Mumbai, 136-147. 2000
- 8) Feser, F., H.-F. Graf, and **J. Perlwitz** 2000. Secular variability of the coupled tropospheric and stratospheric circulation in the GCM ECHAM 3/LSG. *Theor. Appl. Climatol.* 65, 1-15.
- 7) **Perlwitz, J.**, H.-F. Graf, and R. Voss 2000. The leading variability mode of the coupled troposphere-stratosphere winter circulation in different climate regimes. *J. Geophys. Res.* 105, 6915-6926. 1998
- 6) Graf, H.-F., I. Kirchner, and **J. Perlwitz** 1998. Changing lower stratospheric circulation: The role of ozone and greenhouse gases. *J. Geophys. Res.* 103, 11251-11261.
- 5) Graf, H.-F., **J. Perlwitz**, I. Kirchner, and I. Schult 1995. Recent northern winter climate trends, ozone changes and increased greenhouse gas forcing. *Contr. Atmos. Phys.* 68, 233-248. 1995
- 4) **Perlwitz, J.**, and H.-F. Graf 1995. The statistical connection between tropospheric and stratospheric circulation of the Northern Hemisphere in winter. *J. Climate* 8, 2281-2295.
- 3) Graf, H.-F.; **J. Perlwitz**; I. Kirchner and I. Schult, 1995: On the interrelationship between recent climate trends, ozone changes and increased greenhouse gas forcing. In: NATO ASI Series, Subseries I "Global Environmental Change", Vol. 32, ed. by W.-C. Wang and I.S.A. Isaksen, pp. 163-179.
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- 1) Graf, H.-F., **J. Perlwitz**, and I. Kirchner 1994. Northern Hemisphere tropospheric mid-latitude circulation after violent volcanic eruptions. *Contr. Atmos. Phys.* 67, 3-13

Invited Presentations and Lectures since 2009

- Perlwitz J.: The role of stratospheric processes in large- scale tele-connections Annual Seminar, ECMWF, Reading, UK, September 2016.
- Perlwitz, J.: Modeling the Stratosphere: Ozone, Reanalysis, Predictability, and Connections with the Troposphere, NOAA MAPP Webinar Series, 2015.
- Perlwitz, J: On the importance of stratospheric ozone-climate interactions on the predictability of Northern Hemisphere tropospheric climate Keynote speaker, SPARC Local Science Workshop, Boulder, 2015.
- Perlwitz J: Reading the IPCC report: Ch. 10: Detection and Attribution of Climate Change: From Global to Regional. CIRES, Boulder, CO November 2014.
- Perlwitz, J: Modeling Tropospheric Impacts of the 2011 Record Arctic Ozone Loss, NOAA ESRL, Chemical Sciences Division, Boulder, CO, March 2014

- Perlwitz, J, M. Hoerling and R. Dole: Why has the Arctic warmed. NCAR CESM Climate Variability Working Group, Boulder, CO, March 2014
- Perlwitz, J: Modeling Tropospheric Impacts of the 2011 Record Arctic Ozone Loss, IDAG Meeting, Boulder, CO July, 2013.
- Perlwitz, J.: Link between atmospheric blocking and European heat waves. October 2012, Columbia University, New York, NY, USA
- Perlwitz, J.: The anatomy of an extreme event. October 2012, Lamont Doherty Observatory, Columbia University, Palisades, NY, USA
- Perlwitz, J., M. Hoerling, R. Dole, J. Eischeid, P. Pegion, and K. Pegion: Nature of Heat Waves in Western Russia as Simulated with CCSM4.0. NCAR CESM Workshop, Breckenridge, June, 2011, CO, USA
- Perlwitz J.: Development of an Attribution Service Capability, China Meteorological Administration, Beijing, China, 16 November 2010.
- Perlwitz, J., T. Shaw, and N. Harnik: Downward wave coupling between the stratosphere and troposphere and the impact of ozone changes. Institute of Atmospheric Physics Chinese Academy of Sciences, Beijing, China, 16 November, 2010.
- Perlwitz, J., T. Shaw, and N. Harnik: Downward wave coupling between the stratosphere and troposphere and the impact of ozone changes. Peking University, Beijing, China, 15 November, 2010.
- Perlwitz J.: The impact of stratospheric ozone changes on Southern Hemisphere climate. Workshop on Seasonal to Multi-Decadal Predictability of Polar Climate Bergen, Norway, 27 October 2010.
- Perlwitz, J.: Montreal Accomplishments. The impact of stratospheric ozone changes on climate. MIT, Boston, MA, 15 March, 2010.
- Perlwitz, J.: A strong bout of natural cooling in 2008, Lecture in upper-level undergraduate critical thinking course on climate controversies and policy. University of Colorado, Boulder, CO, 9 February 2010.
- Perlwitz, J., M. Hoerling, J. Eischeid, T. Xu, and A. Kumar: Attribution of Evolving Climate Conditions: A Pathway to Nowcasting. The Eighth Workshop on Decadal Climate Variability, St. Michaels, MD, 10 October, 2009.
- Perlwitz J., R. L Fogt, P. A. Newman, W. D. Neff, J. E. Nielsen, L. D. Oman, S. Pawson: The Need for a Coupled Stratosphere-Troposphere-Ocean Modeling System to Assess the Climate Importance of the Montreal Protocol. MOCA-09, Montreal, Canada, July 19 2009.
- Perlwitz, J.: Possible Impact of the Stratosphere on the Predictability of Near Surface Climate. MOCA-09, Canada, 19 July 2009.
- Perlwitz, J.: Montreal Accomplishments. The impact of stratospheric ozone changes on climate. ATOC, University of Colorado, Boulder, CO, 11 September 2009.
- Perlwitz, J.: Do we need the stratosphere to simulate 21st Century Climate Change?. Leibnitz Institute for Atmospheric Physics, Kuehlungsborn, Germany, 5 May 2009
- Perlwitz, J.: Do we need the stratosphere to simulate 21st Century Climate Change?. Met Office, Exeter, United Kingdom, 31 March 2009.
- Perlwitz, J.: Montreal Accomplishments. The impact of stratospheric ozone changes on climate. Oxford University, Oxford, United Kingdom, 26 March 2009.
- Perlwitz, J. : Montreal Accomplishments. The impact of stratospheric ozone changes on climate. University of Reading, Reading, United Kingdom, 24 March 2009.

Perlwitz, J.: Recent Findings on the Impact of Stratospheric Ozone Changes on Climate .
Florida State University, Tallahassee, FL, February 24, 2009.

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NCAR, Boulder, CO, USA, 20 January 2009