

**Dr. ANDREW GETTELMAN**

National Center for Atmospheric Research (NCAR)  
Boulder, Colorado, USA

**PROFESSIONAL EXPERIENCE**

**Visiting Scientist**, European Centre for Medium Range Weather Forecasts, UK, Aug 2019-Jul 2020  
**Visiting Professor**, Atmospheric & Oceanic Physics, Oxford University, UK, Aug 2019-Jul 2020  
**Scientist IV (Senior Scientist)**, NCAR, Boulder, CO, May 2017-Present  
**Erskine Fellow**, University of Canterbury, Christchurch, New Zealand, June-August 2016  
**Visiting Scientist**, Max Planck Institute for Meteorology, Hamburg, June-August 2014  
**Visiting Professor**, ETH Zürich, Switzerland, August 2011-July 2012  
**Scientist III**, NCAR, Boulder, CO, July 2010-May 2017  
**Scientist II**, NCAR, Boulder CO, July 2006-July 2010  
**Scientist I**, NCAR, Boulder CO, July 2003-July 2006  
**Project Scientist**, NCAR, Boulder CO, October 2001-July 2003  
**Postdoctoral Fellow**, Advanced Study Program, NCAR, Boulder, CO, 1999-October 2001

**EDUCATION:**

**University of Washington**, Seattle, WA, Ph.D. Atmospheric Sciences, June 1999.  
**University of Washington**, Seattle, WA, Certificate in Environmental Management, University of Washington Graduate School of Business, 1998  
**Princeton University**, Princeton, NJ, BSE Civil Engineering, Certificate in Architecture 1992

**NARRATIVE of RESEARCH EXPERIENCE:**

My work has evolved over my career. The unifying theme is an overarching desire to understand critical issues in the earth system for society, across chemistry, climate and even weather. My graduate work was on the stratosphere and the connections between the stratosphere and troposphere, including through water vapor. This led to an interest in the Tropical Tropopause Layer (TTL) and the Extra-tropical Upper Troposphere and Lower Stratosphere, and an ongoing interest in the critical issues around radiation and climate. My career mostly started in satellite data analysis. I also started a long-standing interest in the impacts of aviation on climate: first through water vapor, and now through contrails and aerosols. My work on water vapor and the TTL led to interest in cloud processes, especially ice clouds.

I began to use models more, especially global climate models, first by analyzing output, and then learning how to run them. I then began modifying them. About 15 years ago I began a project to improve the clouds in the NCAR climate model. I figured a year or two to improve the liquid clouds and then move on to ice. I am of course still working on liquid and ice clouds. And still working on climate models, having written now a book to explain climate models to those not in the field. I have worked significantly on identifying and characterizing the response of clouds to global warming, which drives uncertainty in the magnitude of global warming.

My background with data analysis and modeling has led to several projects advancing model diagnostics, and leading various modeling intercomparison projects, as well as major model development activities for the Community Earth System Model. The desire to understand critical processes for clouds in climate models has led me to delve further into observations, including participating in field projects. I have been flight scientist flying low across the S. Ocean. I have also been a flight scientist for a former military drone flying high over the Tropical Pacific (from a comfy seat in

the California desert). I am also now working with NASA on developing the next generation of earth observation satellites and the models they will evaluate.

Recently I have been interested in local impacts of climate change felt through severe weather, and other local climate impacts that people experience. I have been working in regional climate and on a major effort at NCAR to unify our weather and climate models for prediction across scales of space and time.

While I have remained at NCAR for most of my career, I have benefited significantly from long stints at ETH Zürich (Zürich, Switzerland), the Max Planck Institute for Meteorology (Hamburg, Germany), the University of Canterbury (Christchurch, New Zealand), the European Centre for Medium Range Weather Forecasts (Reading, UK) and Oxford University (Oxford, UK).

#### **KEY PUBLICATIONS:**

- Gottelman, Andrew, Alan J. Geer, Richard M. Forbes, Greg R. Carmichael, Graham Feingold, Derek J. Posselt, Graeme L. Stephens, Susan C. van den Heever, Adam C. Varble, and Paquita Zuidema. "The Future of Earth System Prediction: Advances in Model-Data Fusion." *Science Advances* 8, no. 14 (2022): eabn3488. <https://doi.org/10.1126/sciadv.abn3488>.
- Gottelman, A., C. Hannay, J. T. Bacmeister, R. B. Neale, A. G. Pendergrass, G. Danabasoglu, J.-F. Lamarque, J. T. Fasullo, D. A. Bailey, D. M. Lawrence, M. J. Mills, High Climate Sensitivity in the Community Earth System Model version 2 (CESM2), *Geophys. Res. Lett.* DOI: 10.1029/2019GL083978, 2019
- Gottelman, A., M. J. Mills, D. E. Kinnison, R. R. Garcia, A. K. Smith, D. R. Marsh, S. Tilmes, F. Vitt, C. G. Bardeen, J. McInerney, H.-L. Liu, S. C. Solomon, L. M. Polvani, L. K. Emmons, J.-F. Lamarque, J. H. Richter, A. S. Glanville, J. T. Bacmeister, A. S. Phillips, R. B. Neale, I. R. Simpson, A. K. DuVivier, A. Hodzic, W. J. Randel, "The Whole Atmosphere Community Climate Model version 6 (WACCM6)", , *J. Geophys. Res. Atmos.*, doi: 10.1029/2019JD030943, 2019
- Gottelman, A., and S. C. Sherwood. "Processes Responsible for Cloud Feedback." *Current Climate Change Reports*, October 1, 2016, 1–11. doi:10.1007/s40641-016-0052-8.
- Gottelman, A. and H. Morrison, 2015: Advanced Two-Moment Bulk Microphysics for Global Models. Part I: Off-Line Tests and Comparison with Other Schemes. *J. Climate*, **28**, 1268–1287. doi: [10.1175/JCLI-D-14-00102.1](https://doi.org/10.1175/JCLI-D-14-00102.1)
- Gottelman, A., J. E. Kay and K. M. Shell, The Evolution of Climate Sensitivity and Climate Feedbacks in the Community Atmosphere Model, *J. Climate*, 25:5, 1453-1469 2012
- Gottelman, A. and R. B. Rood, *Demystifying Climate Models* (2016), Springer, Berlin, 274p. ISBN 978-3-662-48957-4, doi: 10.1007/978-3-662-48959-8
- Gottelman, A. P. Hoor, L. L. Pan, W. J. Randel , M. I. Hegglin and T. Birner, The Extratropical Upper Troposphere and Lower Stratosphere, *Rev. Geophys.*, 49, RG3003, doi:10.1029/2011RG000355, 2011.
- Gottelman, A. and P. M. de F. Forster, A climatology of the tropical tropopause layer, *Journal of the Meteorological Society of Japan*, 80(4B) 911-924, 2002

#### **HONORS:**

- AGU Ascent Award, 2015
- Thompson Reuters Highly Cited Researcher, 2014-2021
- Journal of the Atmospheric Sciences Editor's award, 2004

#### **PROFESSIONAL SOCIETY MEMBERSHIPS:**

- American Geophysical Union (since 1993)