

## JOEL R. NORRIS

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### EDUCATION:

- August 1997 **University of Washington, Seattle, WA**  
Ph.D. Atmospheric Sciences  
Thesis: *Interannual variability in cloudiness, sea surface temperature, and atmospheric circulation over the midlatitude North Pacific during summer.*  
Committee: Professors Conway Leovy (advisor), Christopher Bretherton, J. Michael Wallace, Dennis Hartmann, David Battisti, Stephen Warren, Richard Gammon.
- June 1990 **California Institute of Technology, Pasadena, CA**  
B.S. Geophysics

### PROFESSIONAL EXPERIENCE:

- September 2000 to present **Scripps Institution of Oceanography, La Jolla, CA**  
*Professor:* Research on the role of clouds and aerosols in the climate system. Evaluation of global climate models. Observational investigation of cloud processes and cloud feedbacks. (*Assistant Professor before July 2006 and Associate Professor before July 2010.*)
- November 1999 through August 2000 **Geophysical Fluid Dynamics Laboratory, Princeton, NJ**  
*Visiting Scientist:* Validation of cloud parameterizations in the GFDL Flexible Modeling System. Research on the role of tropical forcing and atmospheric noise in producing North Pacific interdecadal variability.
- October 1997 through October 1999 **National Center for Atmospheric Research, Boulder, CO**  
*Postdoctoral Research Fellow:* Validation of cloud parameterizations in the NCAR Community Climate Model. Research on midlatitude cloud processes using observations and the NCAR Climate System Model.

### TEACHING EXPERIENCE:

- September 2000 to present **Scripps Institution of Oceanography, La Jolla, CA**  
*Professor:* Organized and developed the Climate Sciences Curricular Group and several individual courses. Research advisor for graduate and undergraduate students. (*Assistant Professor before July 2006 and Associate Professor before July 2010.*)
- Summer 1995 **University of Washington, Seattle, WA**  
*Instructor:* Developed curriculum and provided all lectures, homeworks, and exams.
- Summer 1990 **California Institute of Technology, Pasadena, CA**  
*Instructor for High School Physics Program:* Provided all lectures, homeworks, and exams.

**Courses Taught:** Atmospheric and Climate Sciences II: Atmospheric Dynamics (*graduate lecture*)  
The Physical Climate System (*undergraduate lecture*)  
Weather (for non-majors) (*undergraduate lecture*)  
Advanced Atmospheric Dynamics (*graduate seminar*)  
Weather Discussion (*graduate seminar*)  
Temperature Inversions and Air Quality over California (*graduate seminar*)  
Introduction to Weather (*graduate seminar*)  
Boundary Layer Clouds (*graduate seminar*)  
Atmospheric Circulation (*graduate seminar*)  
Extratropical Coupled Atmosphere—Ocean Variability (*graduate seminar*)

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### STUDENTS ADVISED:

June 2001 – August 2001	Tamara Beitzel (undergraduate student)
July 2002 – March 2008	Neil Gordon (Ph.D. student)
September 2003 – May 2004	Lelia Nahid (undergraduate student)
July 2004 – March 2008	David Mansbach (graduate student)
January 2006 – September 2008	Guillaume Mauger (Ph.D. student)
March 2009 – June 2009	John Dwyer (graduate student)
July 2010 – present	Timothy Myers (graduate student)

### POSTDOCS ADVISED:

November 2010 – present	Robert Allen
March 2008 – February 2010	Christian Ruckstuhl
September 2008 – December 2008	Guillaume Mauger

### SERVICE:

February 2010 to present	Member of Climate Variability and Predictability (CLIVAR) Process Study Model Improvement Panel
Julys of 2007-2009	Lead instructor for “Living Oceans and Climate Change” cluster of the California State Summer School for Mathematics and Science (COSMOS) program
August 2001 to present	Curriculum Advisor for the Climate Sciences Curricular Group at the Scripps Institution of Oceanography.
September 2000 to present	Scripps Institution of Oceanography representative to the University Corporation for Atmospheric Research.
2001-2003	Open House Coordinator for the SIO Climate Sciences Curricular Group.  Reviewer for <i>Annales Geophysicae</i> , <i>Atmosphere-Ocean</i> , <i>Atmospheric Chemistry and Physics</i> , <i>Atmospheric Environment</i> , <i>Atmospheric Science Letters</i> , <i>Bulletin of the American Meteorological Society</i> , <i>Climate Dynamics</i> , <i>Climate Research</i> , <i>Geofyzika</i> , <i>Geophysical Research Letters</i> , <i>International Journal of Climatology</i> , <i>Journal of Advances in Modeling Earth Systems</i> , <i>Journal of Atmospheric and Solar-Terrestrial Physics</i> , <i>Journal of the Atmospheric Sciences</i> , <i>Journal of Climate</i> , <i>Journal of Geophysical Research – Atmospheres</i> , <i>Meteorologische Zeitschrift</i> , <i>Monthly Weather Review</i> , <i>Nature Climate Change</i> , <i>Quarterly Journal of the Royal Meteorological Society</i> , and <i>Science</i> .  Reviewer for NSF Climate Dynamics Program, NSF Ocean Sciences Program, NOAA Climate and Global Change Program, NASA New Investigator Program, NASA Earth Science, NASA Postdoctoral Program, DOE Atmospheric Radiation Measurement Program, U.S. Civilian Research and Development Foundation, Chilean Millennium Science Initiative, Netherlands Organisation for Scientific Research, and the South African National Research Foundation.

### FUNDING AWARDED:

2010	Lead Investigator. “Multidecadal cloud variability and climate change in observations and CMIP5,” National Oceanic and Atmospheric Administration, \$239 135 (08/01/2010 – 07/31/2012)
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- 2010 *Co-Principal Investigator*. “Regional coupled ocean-atmosphere feedback processes affecting climate along the California coast,” National Science Foundation, \$652 703 (03/01/2010 – 02/28/2013)
- 2010 *Co-Principal Investigator*. “An investigation into feedbacks between marine stratiform cloud, atmospheric circulation and temperature on decadal timescales and in anthropogenic change,” National Science Foundation, \$333 001 (01/01/2010 – 12/31/2012)
- 2003 *Principal Investigator*. “Cloud trends and global climate change,” National Science Foundation (CAREER Program), \$451 015 (03/01/2003 – 02/28/2008)
- 2002 *Principal Investigator*. “Impact of synoptic forcing on extratropical cloudiness and climate variability,” National Aeronautics and Space Administration (Earth Science), \$330 000 (03/01/2002 – 02/28/2007)
- 2002 *Lead Principal Investigator*. “Parameterization of mesoscale circulations and frontal cloudiness in GCMs based on ARM observations,” Department of Energy (Atmospheric Radiation Measurement Program), \$231 678 (01/01/2002 - 12/31/2005)

### PUBLICATIONS IN PROGRESS:

Ruckstuhl, C., and J. R. Norris, 2010: Does the IPCC AR5 aerosol emission history reproduce observed trends in surface solar radiation over Europe and East Asia? *J. Geophys. Res. -Atmos.*, submitted.

### PEER-REVIEWED PUBLICATIONS:

- Clement, A. C., R. Burgman, and J. R. Norris, 2010: Response to Comment on “Observational and model evidence for positive low-level cloud feedback”. *Science*, **329**, 277.
- Gordon, N. D., and J. R. Norris, 2010: Cluster analysis of midlatitude oceanic cloud regimes: mean properties and temperature sensitivity. *Atmos. Chem. Phys.*, **10**, 6435–6459.
- Mauger, G. S., and J. R. Norris, 2010: Assessing the impact of meteorological history on subtropical cloud fraction. *J. Climate*, **23**, 2926-2940.
- Dwyer, J. G., J. R. Norris, and C. Ruckstuhl, 2010: Do climate models reproduce observed solar “dimming” and “brightening” over China and Japan? *J. Geophys. Res. -Atmos.*, **115**, D00K08, doi:10.1029/2009JD012945.
- Ruckstuhl, C., J. R. Norris, and R. Philipona, 2010: Is there evidence for an aerosol indirect effect during the recent aerosol optical depth decline in Europe? *J. Geophys. Res. -Atmos.*, **115**, D04204, doi:10.1029/2009JD012867.
- Clement, A. C., R. Burgman, and J. R. Norris, 2009: Observational and model evidence for positive low-level cloud feedback. *Science*, **325**, 460-464.
- Norris, J. R., and M. Wild, 2009: Trends in aerosol radiative effects over China and Japan inferred from observed cloud cover, solar “dimming,” and solar “brightening”. *J. Geophys. Res. -Atmos.*, **114**, D00D15, doi:10.1029/2008JD011378.
- Ruckstuhl, C., and J. R. Norris, 2009: How do aerosol histories affect solar “dimming” and “brightening” over Europe?: IPCC-AR4 models versus observations. *J. Geophys. Res.*, **114**, D00D04, doi:10.1029/2008JD011066.
- Norris, J. R., and A. Slingo, 2009: Trends in observed cloudiness and Earth’s radiation budget: what do we not know and what do we need to know? in *Clouds in the Perturbed Climate System*, edited by J. Heintzenberg and R. J. Charlson, MIT Press, 17-36.
- Norris, J. R., 2008: Observed interdecadal changes in cloudiness: real or spurious? in *Climate Variability and Extremes During the Past 100 Years*, edited by S. Brönnimann et al., Springer, 169-178.
- Mauger, G. S., and J. R. Norris, 2007: Meteorological bias in satellite estimates of aerosol-cloud relationships. *Geophys. Res. Lett.*, **34**, L16824, doi:10.1029/2007GL029952.

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- Norris, J. R., and M. Wild, 2007: Trends in aerosol radiative effects over Europe inferred from observed cloud cover, solar “dimming”, and solar “brightening”. *J. Geophys. Res. -Atmos.*, **112**, D08214, doi:10.1029/2006JD007794.
- Mansbach, D. K., and J. R. Norris, 2007: Low-level cloud variability over the equatorial cold tongue in observations and GCMs. *J. Climate*, **20**, 1555-1570.
- Alexander, M., J. Yin, G. Branstator, A. Capotondi, C. Cassou, R. Cullather, Y.-O. Kwon, J. Norris, J. Scott, and I. Wainer, 2006: Extratropical atmosphere-ocean variability in CCSM3. *J. Climate*, **19**, 2496-2525.
- Pepin, N. C., and J. R. Norris, 2005: An examination of the differences between surface and free-air temperature trend at high-elevation sites: relationships with cloud cover, snow cover, and wind. *J. Geophys. Res. -Atmos.*, **110**, D24112, doi:10.1029/2005JD006150.
- Norris, J. R., and S. F. Iacobellis, 2005: North Pacific cloud feedbacks inferred from synoptic-scale dynamic and thermodynamic relationships. *J. Climate*, **18**, 4862-4878.
- Norris, J. R., 2005: Trends in upper-level cloud cover and surface divergence over the tropical Indo-Pacific Ocean between 1952 and 1997. *J. Geophys. Res. -Atmos.*, **110**, D21110, doi:10.1029/2005JD006183.
- Weaver, C. P., J. R. Norris, N. D. Gordon, and S. A. Klein, 2005: Dynamical controls on sub-global climate model grid-scale cloud variability for Atmospheric Radiation Measurement Program (ARM) case 4. *J. Geophys. Res. -Atmos.*, **110**, D15S05, doi:10.1029/2004JD005022.
- Kim, B.-G., S. A. Klein, and J. R. Norris, 2005: Continental liquid water cloud variability and its parameterization using Atmospheric Radiation Measurement data. *J. Geophys. Res. -Atmos.*, **110**, D15S08, doi:10.1029/2004JD005122.
- Gordon, N. D., J. R. Norris, C. P. Weaver, and S. A. Klein, 2005: Cluster analysis of cloud regimes and characteristic dynamics of midlatitude synoptic systems in observations and a model. *J. Geophys. Res. -Atmos.*, **110**, D15S17, doi:10.1029/2004JD005027.
- Norris, J. R., 2005: Multidecadal changes in near-global cloud cover and estimated cloud cover radiative forcing. *J. Geophys. Res. -Atmos.*, **110**, D08206, doi:10.1029/2004JD005600.
- Miller, A. J., M. A. Alexander, G. J. Boer, F. Chai, K. Denman, D. J. Erickson, R. Frouin, A. J. Gabric, E. A. Laws, M. R. Lewis, Z. Liu, R. Murtugudde, S. Nakamoto, D. J. Neilson, J. R. Norris, J. C. Ohlmann, R. I. Perry, N. Schneider, K. M. Shell, and A. Timmermann, 2003: Potential feedbacks between Pacific Ocean ecosystems and interdecadal climate variations. *Bull. Amer. Meteor. Soc.*, **84**, 617-633.
- Norris, J. R., 2001: Has Northern Indian Ocean cloud cover changed due to increasing anthropogenic aerosol? *Geophys. Res. Lett.*, **28**, 3271-3274.
- Norris, J. R., and C. P. Weaver, 2001: Improved techniques for evaluating GCM cloudiness applied to the NCAR CCM3. *J. Climate*, **14**, 2540-2550.
- Norris, J. R., 2000: What can cloud observations tell us about climate variability? *Space Science Reviews*, **94**, 375-380.
- Norris, J. R., 2000: Interannual and interdecadal variability in the storm track, cloudiness, and sea surface temperature over the summertime North Pacific. *J. Climate*, **13**, 422-430.
- Norris, J. R., and S. A. Klein, 2000: Low cloud type over the ocean from surface observations. Part III: relationship to vertical motion and the regional surface synoptic environment. *J. Climate*, **13**, 245-256.
- Norris, J. R., 1999: On trends and possible artifacts in global ocean cloud cover between 1952 and 1995. *J. Climate*, **12**, 1864-1870.
- Norris, J. R., Y. Zhang, and J. M. Wallace, 1998: Role of low clouds in summertime atmosphere-ocean interactions over the North Pacific. *J. Climate*, **11**, 2482-2490.
- Zhang, Y., J. R. Norris, and J. M. Wallace, 1998: Seasonality of large scale atmosphere-ocean interaction over the North Pacific. *J. Climate*, **11**, 2473-2481.

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- Norris, J. R., 1998: Low cloud type over the ocean from surface observations. Part II: geographical and seasonal variations. *J. Climate*, **11**, 383-403.
- Norris, J. R., 1998: Low cloud type over the ocean from surface observations. Part I: relationship to surface meteorology and the vertical distribution of temperature and moisture. *J. Climate*, **11**, 369-382.
- Klein, S. A., D. L. Hartmann, and J. R. Norris, 1995: On the relationships among low-cloud structure, sea surface temperature, and atmospheric circulation in the summertime northeast Pacific. *J. Climate*, **8**, 1140-1155.
- Norris, J. R., and C. B. Leovy, 1995: Comments on "Trends in global marine cloudiness and anthropogenic sulphur". *J. Climate*, **8**, 2109-2110.
- Norris, J. R., and C. B. Leovy, 1994: Interannual variability in stratiform cloudiness and sea surface temperature. *J. Climate*, **7**, 1915-1925.

### CONFERENCE PRESENTATIONS:

- December 2010 "Observed poleward shift in storm track cloudiness during recent decades," American Geophysical Union Fall Meeting, San Francisco, CA.
- December 2010 "Interannual variability in MISR cloud top height compared to MODIS and CERES," MISR Data Users Science Symposium, Pasadena, CA.
- May 2010 (invited) "Cloud feedbacks on climate: a challenging scientific problem," Fermi National Accelerator Laboratory Colloquium, Batavia, IL
- January 2010 (invited) "Subtropical stratocumulus processes and feedbacks: the role of large-scale dynamics," Center for Multiscale Modeling of Atmospheric Processes Team Meeting, La Jolla, CA
- September 2009 "The role of dynamics in cloud feedbacks," Keck Institute for Space Studies workshop, Pasadena, CA.
- April 2009 (invited) "Clouds in the climate system: Why is this such a difficult problem, and where do we go from here?," CERES Science Team meeting, Newport News, VA.
- February 2008 (invited) "Cloud cover trends and solar dimming and brightening over Europe and East Asia," Workshop on Global Dimming and Brightening, Ein Gedi, IL.
- December 2006 "Multidecadal trends in aerosol radiative effects over Europe in observations and IPCC AR4 models," American Geophysical Union Fall Meeting, San Francisco, CA.
- July 2006 "Cloud processes and feedbacks over the North Pacific and eastern equatorial Pacific," Techniques for identifying likely artifacts in cloud data," ETH Zürich, Zürich, Switzerland.
- July 2006 (invited) "Observed interdecadal changes in cloudiness," Workshop on Climate Variability and Extremes During the Past 100 Years, Gwatt, Switzerland.
- July 2006 (poster) "Solar dimming and brightening over Europe in observations and AR4 global climate models," Workshop on Climate Variability and Extremes During the Past 100 Years, Gwatt, Switzerland.
- July 2006 "Techniques for identifying likely artifacts in cloud data," GEWEX Cloud Climatology Assessment Workshop, Madison, WI.
- March 2006 "European solar 'dimming' and 'brightening' as a diagnostic for aerosol simulation in GCMs," Atmosphere Model Working Group Meeting, Boulder, CO.
- December 2005 "Multidecadal regional cloud and radiation changes," American Geophysical Union Fall Meeting, San Francisco, CA.
- June 2005 "Multidecadal tropical cloud variability in observations and GCMs," 5th International Conference on the Global Energy and Water Cycle, Costa Mesa, CA.
- January 2005 "Interdecadal tropical cloud variability in observations and the CCSM3," Annual American Meteorological Society Meeting, San Diego, CA.
- January 2005 "Summertime North Pacific cloud feedbacks inferred from synoptic-scale dynamic and

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- (poster) thermodynamic relationships,” Annual American Meteorological Society Meeting, San Diego, CA.
- October 2004 “Observed surface/satellite cloud/radiation trends... where do we believe them?” Climate Process Team Meeting, Seattle, WA.
- May 2004 “Changes in near-global cloud cover and reconstructed radiation flux since 1952,” UCLA Atmospheric Science Department, Los Angeles, CA.
- January 2004 “Changes in global ocean cloud cover and related radiation flux since 1952,” Annual American Meteorological Society Meeting, Seattle, WA.
- December 2003 “Observed global cloud and radiation flux changes since 1952,” American Geophysical Union Fall Meeting, San Francisco, CA.
- October 2003 “Cloud regime analyses for Case 4,” Atmospheric Radiation Measurement Program Cloud Parameterization and Modeling Working Group Meeting, Broomfield, CO.
- September 2003 “Observed and simulated low-level cloud and lower tropospheric stratification,” Joint NCAR-GFDL Modeling Workshop, Princeton, NJ.
- June 2003 “Comparison of observed and simulated historical cloud and radiation trends: implications for climate sensitivity,” Annual Community Climate System Model Workshop, Breckenridge, CO.
- May 2003 (invited) “Observed cloud cover trends and global climate change,” Division of Geological and Planetary Sciences at the California Institute of Technology, Pasadena, CA.
- February 2003 “Observed changes in mean tropical oceanic cloudiness and net radiation since 1952,” Annual American Meteorological Society Meeting, Long Beach, CA.
- December 2002 “Evidence for globally decreasing subtropical marine stratocumulus since 1952,” American Geophysical Union Fall Meeting, San Francisco, CA.
- November 2002 “Cloud and meteorological conditions during the March 2000 IOP,” Atmospheric Radiation Measurement Program Cloud Parameterization and Modeling Working Group Meeting, Reston, VA.
- June 2002 (invited) “Variability of extratropical cloudiness and related meteorological parameters in the CCSM2,” Annual Community Climate System Model Workshop, Breckenridge, CO.
- April 2002 (poster) “Towards parameterization of frontal mesoscale circulations and cloudiness in GCMs based on ARM observations,” Atmospheric Radiation Measurement Program Science Team Meeting, St. Petersburg, FL.
- January 2002 “Tropical forcing of North Pacific decadal and interdecadal variability explored using a GCM ensemble,” Annual American Meteorological Society Meeting, Orlando, FL.
- December 2001 (poster) “Interdecadal variability of midlatitude North Pacific sea surface temperature: a modeling analysis considering tropical forcing and atmospheric variability,” American Geophysical Union Fall Meeting, San Francisco, CA.
- June 2001 (poster) “Evaluation of synoptic cloudiness in the CCSM and ideas for improved parameterization,” Annual Community Climate System Model Workshop, Breckenridge, CO.
- June 2000 (poster) “New techniques for evaluating GCM cloudiness applied to the GFDL Flexible Modeling System (FMS),” Gordon Research Conference on Solar Radiation and Climate, New Haven, CT.
- September 1999 “Improved techniques for evaluating GCM cloudiness,” Joint 8th Conference on Climate Variations/13th Conference on Numerical Weather Prediction, Denver, CO.
- June 1999 (invited) “What can cloud observations tell us about climate variability?” ISSI Workshop on Solar Variability and Climate, Bern, Switzerland.
- April 1999 “A proposed diagnostic technique for midlatitude cloudiness applied to CCM,” Atmosphere Model Working Group Meeting, Boulder, CO.

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- November 1998 “Coupled variability in summertime cloudiness, sea surface temperature, and the storm track in the NCAR Climate System Model,” GCSS–WGNE Workshop on Cloud Processes and Cloud Feedbacks in Large-Scale Models, Reading, UK.
- June 1998 “Simplified large-scale cloud parameterization,” Annual Climate System Model Workshop, Breckenridge, CO.
- March 1998 “Evaluation of cloud parameterizations in the NCAR Community Climate Model 3,” Atmosphere Model Working Group Meeting, Boulder, CO.
- July 1997  
(poster) “Relationships between cloud type and boundary layer structure over the ocean,” Symposium on Boundary Layers and Turbulence, Vancouver, BC.
- December 1993  
(poster) “Using ISCCP Data to evaluate cloudiness in an atmospheric GCM,” American Geophysical Union Fall Meeting, San Francisco, CA.
- January 1993 “Interannual variability in stratiform cloudiness and sea surface temperature,” Annual American Meteorological Society Meeting, Anaheim, CA.