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EDUCATION

1994	Ph.D. Atmospheric Science, University of Wisconsin	Madison, WI
1983	M.S. Meteorology, University of Wisconsin	Madison, WI
1979	B.A. Integrated Science, Northwestern University	Evanston, IL

EMPLOYMENT

	Geophysical Fluid Dynamics Laboratory/NOAA	Princeton, NJ
2012-present	Supervisory Physical Scientist, GFDL Science Board	
2001-2012	Group Leader, <u>Climate Change, Variability and Prediction Group</u>	
1984- 2001	Research Meteorologist, Climate Dynamics Group	

RESEARCH INTERESTS

- Climate variability, change and predictability on decadal to centennial time scales, with emphasis on:
 - the role of the oceans in climate
 - changes in continental hydrology, including drought and extreme events
 - large-scale modes of climate variability; mechanisms and potential changes
- Use of global coupled ocean-atmosphere models to study climate variability and change
- Interactions between forced climate change and internal variability

HONORS & AWARDS

2015	Gold Medal, Department of Commerce
2014,2015,2016	Thomson Reuters Highly Cited Researcher (highlycited.com)
2014	Fellow of the American Meteorological Society
2008	NOAA Administrators Award
2005	Silver Medal, Department of Commerce
1996, 2003	Outstanding Scientific Paper Award, NOAA
1980-1983	National Science Foundation, Graduate Fellowship
1979	Phi Beta Kappa Honorary Society

WEB OF SCIENCE:

h-index: 48 (<http://www.researcherid.com/rid/C-5191-2014>)

TEACHING

Lecturer, Princeton University, Atmospheric and Oceanic Sciences
Courses taught: AOS 577 "*Climate of the Earth: Present, Past and Future*"
GEO 427 "*Fundamentals of the Earth's Climate System*"

MENTORING

Postdoctoral advisor for:

Dr. Myriam Khodri, Dr. Jian Lu, Dr. Rym Msadek, Dr. Salil Mahajan, Dr. Sarah Kapnick,
Dr. Liping Zhang, Dr. Honghai Zhang, Dr. Yohan Ruprich-Robert

Graduate student committee member for:

Ying Li, Andrew Ballinger, He Wang, Jeffrey Strong, Jane Baldwin, Geeta Persad

ADDITIONAL ACTIVITIES

2016-present	Chair, Science Advisory Board, UK ACSIS Program
2014-present	Advisory Board, DOE Accelerated Climate Modeling for Energy project
2012	Member, International Review Team for UK RAPID Program
2011-2012	NRC committee on "A National Strategy for Advancing Climate Modeling"
2009-2011	U.S. CLIVAR Working Group on Decadal Prediction
2007-2009	U.S. AMOC Science Planning Team
2007	Program Manager, NOAA Climate Predictions and Projections
2006-2009	U.S. CLIVAR Working Group on Drought
2005-2008	U.S. CLIVAR Prediction, Predictability, and Application Interface Panel
2004-2005	U.S. CLIVAR Scientific Steering Committee
2003-2004	Co-Leader, GFDL Coupled Model Development Team
2001-2004	NSF Arctic System Science Program - OAI, Scientific Steering Committee
2000-2006	Joint Scientific Council/CLIVAR Working Group on Coupled Modeling
2000-2003	SEARCH Science Steering Committee (Interagency Arctic Program)
1999-2003	International CLIVAR Atlantic Implementation Panel
1995-2005	NSF Climate System Laboratory Computing Allocation Panel
1995, 2001, 2007	Intergovernmental Panel on Climate Change, Contributing Author
1995-1997	NOAA's Atlantic Climate Change Program, Scientific Working Group
1995-1996	Atlantic Climate and Circulation Experiment, Scientific Planning Committee

AFFILIATIONS

American Meteorological Society
American Geophysical Union

PUBLICATIONS

Publications last 3 years (2014-2016) below; for a complete list (130 in total) please see <http://www.gfdl.noaa.gov/bibliography/resultstest.php?author=1019>

Zhang, Honghai, Thomas L Delworth, Fanrong Zeng, Gabriel A Vecchi, Karen Paffendorf, and Liwei Jia, *in press*: **Detection, Attribution and Projection of Regional Rainfall Changes on (Multi-) Decadal Time Scales: A Focus on Southeastern South America.** *Journal of Climate*. DOI:10.1175/JCLI-D-16-0287.1.

Delworth, Thomas L., and Fanrong Zeng, February 2016: **The impact of the North Atlantic Oscillation on climate through its influence on the Atlantic Meridional Overturning Circulation.** *Journal of Climate*, **29(3)**, DOI:10.1175/JCLI-D-15-0396.1

Delworth, Thomas L., Fanrong Zeng, Gabriel A Vecchi, Xiaosong Yang, Liping Zhang, and Rong Zhang, July 2016: **The North Atlantic Oscillation as a driver of rapid climate change in the Northern Hemisphere.** *Nature Geoscience*, **9(7)**, DOI:10.1038/ngeo2738

Jia, Liwei, Gabriel A Vecchi, Xiaosong Yang, Richard G Gudgel, Thomas L Delworth, William F Stern, Karen Paffendorf, Seth D Underwood, and Fanrong Zeng, June 2016: **The Roles of Radiative Forcing, Sea Surface Temperatures, and Atmospheric and Land Initial Conditions in U.S. Summer Warming Episodes**. *Journal of Climate*, **29(11)**, DOI:10.1175/JCLI-D-15-0471.1

Murakami, Hiroyuki, Gabriel A Vecchi, G Villarini, Thomas L Delworth, Richard G Gudgel, Seth D Underwood, Xiaosong Yang, Wei Zhang, and Shian-Jiann Lin, *in press*: **Seasonal Forecasts of Major Hurricanes and Landfalling Tropical Cyclones using a High-Resolution GFDL Coupled Climate Model**. *Journal of Climate*. DOI:10.1175/JCLI-D-16-0233.1. August 2016.

Pascale, S, S Bordoni, Sarah B Kapnick, Gabriel A Vecchi, Liwei Jia, Thomas L Delworth, Seth D Underwood, and Whit G Anderson, *in press*: **The impact of horizontal resolution on North American monsoon Gulf of California moisture surges in a suite of coupled global climate models**. *Journal of Climate*. DOI:10.1175/JCLI-D-16-0199.1. August 2016

Saba, Vincent S., Stephen M Griffies, Whit G Anderson, Michael Winton, M A Alexander, Thomas L Delworth, J A Hare, Matthew J Harrison, Anthony Rosati, Gabriel A Vecchi, and Rong Zhang, January 2016: **Enhanced warming of the northwest Atlantic Ocean under climate change**. *Journal of Geophysical Research*, **121(1)**, DOI:10.1002/2015JC011346

van der Wiel, Karin, Sarah B Kapnick, Gabriel A Vecchi, William F Cooke, Thomas L Delworth, Liwei Jia, Hiroyuki Murakami, Seth D Underwood, and Fanrong Zeng, *in press*: **The resolution dependence of contiguous US precipitation extremes in response to CO forcing**. *Journal of Climate*. DOI:10.1175/JCLI-D-16-0307.1. August 2016

Zhang, Wei, Gabriel A Vecchi, Hiroyuki Murakami, Thomas L Delworth, Andrew T Wittenberg, Anthony Rosati, Seth D Underwood, Whit G Anderson, Lucas M Harris, Richard G Gudgel, Shian-Jiann Lin, G Villarini, and Jan-Huey Chen, February 2016: **Improved Simulation of Tropical Cyclone Responses to ENSO in the Western North Pacific in the High-Resolution GFDL HiFLOR Coupled Climate Model**. *Journal of Climate*, **29(4)**, DOI:10.1175/JCLI-D-15-0475.1

Zhang, Liping, and Thomas L Delworth, August 2016: **Simulated response of the Pacific decadal oscillation to climate change**. *Journal of Climate*, **29(16)**, DOI:10.1175/JCLI-D-15-0690.1

Zhang, Liping, Thomas L Delworth, and Fanrong Zeng, *in press*: **The impact of multidecadal Atlantic meridional overturning circulation variations on the Southern Ocean**. *Climate Dynamics*. DOI:10.1007/s00382-016-3190-8. May 2016

Zhang, Rong, R Sutton, G Danabasoglu, and Thomas L Delworth, et al., June 2016: **Comment on "The Atlantic Multidecadal Oscillation without a role for ocean circulation"**. *Science*, **352(6293)**, DOI:10.1126/science.aaf1660

Zhang, Liping, and Thomas L Delworth, August 2016: **Impact of the Antarctic bottom water formation on the Weddell Gyre and its northward propagation characteristics in GFDL model**. *Journal of Geophysical Research*, **121(8)**, DOI:10.1002/2016JC011790

Zhang, Wei, Gabriel A Vecchi, G Villarini, Hiroyuki Murakami, Thomas L Delworth, Liwei Jia, Richard G Gudgel, and Fanrong Zeng, *in press*: **Simulated Connections between ENSO and Tropical Cyclones near Guam in a High-Resolution GFDL Coupled Climate Model: Implications for Seasonal Forecasting**. *Journal of Climate*. DOI:10.1175/JCLI-D-16-0126.1.

Zhang, Liping, and Thomas L Delworth, 2015: **Analysis of the characteristics and mechanisms of the Pacific Decadal Oscillation in a suite of coupled models from the Geophysical Fluid**

Dynamics Laboratory. *Journal of Climate*. DOI:10.1175/JCLI-D-14-00647.1.

Murakami, Hiroyuki, Gabriel A Vecchi, Seth D Underwood, Thomas L Delworth, Andrew T Wittenberg, Whit G Anderson, Jan-Huey Chen, Rich Gudgel, Lucas M Harris, Shian-Jiann Lin, and Fanrong Zeng, *in press*: **Simulation and Prediction of Category 4 and 5 Hurricanes in the High-Resolution GFDL HiFLOR Coupled Climate Model.** *Journal of Climate*. DOI:10.1175/JCLI-D-15-0216.1.

Delworth, T.L., F. Zeng, A. Rosati, G.A. Vecchi, A.T. Wittenberg, 2015: **A link between the hiatus in global warming and North American drought.** *Journal of Climate*, **28(9)**, DOI:10.1175/JCLI-D-14-00616.1.

Jia, Liwei, Xiaosong Yang, Gabriel A Vecchi, Rich Gudgel, Thomas L Delworth, Anthony Rosati, William F Stern, Andrew T Wittenberg, Lakshmi Krishnamurthy, Shaoqing Zhang, Rym Msadek, Sarah B Kapnick, Seth D Underwood, Fanrong Zeng, Whit G Anderson, V Balaji, and Keith W Dixon, March 2015: **Improved Seasonal Prediction of Temperature and Precipitation over Land in a High-resolution GFDL Climate Model.** *Journal of Climate*, **28(5)**, DOI:10.1175/JCLI-D-14-00112.1.

Krishnamurthy, Lakshmi, Gabriel A Vecchi, Rym Msadek, Andrew T Wittenberg, Thomas L Delworth, and Fanrong Zeng, 2015: **The Seasonality of the Great Plains Low-Level Jet and ENSO Relationship.** *Journal of Climate*, **28(11)**, DOI:10.1175/JCLI-D-14-00590.1.

Yang, Xiaosong, Gabriel A Vecchi, Rich Gudgel, Thomas L Delworth, Shaoqing Zhang, Anthony Rosati, Liwei Jia, William F Stern, Andrew T Wittenberg, Sarah B Kapnick, Rym Msadek, Seth D Underwood, Fanrong Zeng, Whit G Anderson, and V Balaji, May 2015: **Seasonal predictability of extratropical storm tracks in GFDL's high-resolution climate prediction model.** *Journal of Climate*, **28(9)**, DOI:10.1175/JCLI-D-14-00517.1.

Winton, M., W.G. Anderson, T.L. Delworth, S.M. Griffies, W.J. Hurlin, and A. Rosati, 2014: **Has coarse ocean resolution biased simulations of transient climate sensitivity?** *Geophys. Res. Letters*, DOI: 10.1002/2014GL061523

Delworth, Thomas L., and Fanrong Zeng, August 2014: **Regional rainfall decline in Australia attributed to anthropogenic greenhouse gases and ozone levels.** *Nature Geoscience*, **7(8)**, DOI:10.1038/ngeo2201.

Griffies, Stephen M., Michael Winton, Whit G Anderson, Rusty Benson, Thomas L Delworth, C O Dufour, John P Dunne, P Goddard, A K Morrison, Andrew T Wittenberg, J Yin, and Rong Zhang: **Impacts on ocean heat from transient mesoscale eddies in a hierarchy of climate models.** *Journal of Climate*. DOI:10.1175/JCLI-D-14-00353.1. 11/14

Kapnick, Sarah B., Thomas L Delworth, M Ashfaq, Sergey Malyshev, and P C D Milly, November 2014: **Snowfall less sensitive to warming in Karakoram than in Himalayas due to a unique seasonal cycle.** *Nature Geoscience*, **7(11)**, DOI:10.1038/ngeo2269

Kim, Hyeong-Seog, Gabriel A Vecchi, Thomas R Knutson, Whit G Anderson, Thomas L Delworth, Anthony Rosati, Fanrong Zeng, and Ming Zhao, November 2014: **Tropical Cyclone Simulation and Response to CO2 Doubling in the GFDL CM2.5 High-Resolution Coupled Climate Model.** *Journal of Climate*, **27(21)**, DOI:10.1175/JCLI-D-13-00475.1.

Msadek, Rym, Thomas L Delworth, Anthony Rosati, Whit G Anderson, Gabriel A Vecchi, You-Soon Chang, Keith W Dixon, Rich Gudgel, William F Stern, Andrew T Wittenberg, X-Q Yang, Fanrong Zeng, Rong Zhang, and Shaoqing Zhang, September 2014: **Predicting a Decadal Shift in North Atlantic Climate Variability Using the GFDL Forecast System.** *Journal of Climate*, **27(17)**, DOI:10.1175/JCLI-D-13-00476.1.

Vecchi, Gabriel A., Rym Msadek, Whit G Anderson, You-Soon Chang, Thomas L Delworth, Keith W Dixon, Rich Gudgel, Anthony Rosati, William F Stern, G Villarini, Andrew T Wittenberg, Xiaosong Yang, Fanrong Zeng, Rong Zhang, and Shaoqing Zhang, January 2014: **Reply to Comment on Multi-year Predictions of North Atlantic Hurricane Frequency: Promise and limitations.** *Journal of Climate*, **27(1)**, DOI:10.1175/JCLI-D-13-00381.1.

Wittenberg, Andrew T., Anthony Rosati, Thomas L Delworth, Gabriel A Vecchi, and Fanrong Zeng, April 2014: **ENSO modulation: Is it decadal predictability?** *Journal of Climate*, **27(7)**, DOI:10.1175/JCLI-D-13-00577.1.