

Curriculum Vitae

Ming Cai

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General Information

University address: Earth, Ocean, & Atmospheric Science
College of Arts and Sciences
Love Building 0404
Florida State University
Tallahassee, Florida 32306-4520
Phone: 850-645-1551

E-mail address: cai@met.fsu.edu

Professional Preparation

1990 Ph.D., University of Illinois at Urbana-Champaign. Major: Meteorology.
Supervisor: Mankin Mak.

Cai, M. (1990). *Basic Dynamics of Low Frequency Variability and the Storm Tracks*. Unpublished doctoral dissertation, University of Illinois at Urbana-Champaign.

1985 M.S., University of Illinois at Urbana-Champaign. Major: Atmospheric Sciences.

1982 B.S., Nanjing Inst. of Meteorology, P.R. China. Major: Atmospheric Sciences.

Professional Experience

2010–present Professor, Department of Earth, Ocean & Atmospheric Science, College of Arts and Sciences, Florida State University.

2003–2010 Associate Professor, Department of Meteorology, College of Arts and Sciences, Florida State University.

1999–2003 Associate Research Scientist, Department of Meteorology, University of Maryland at College Park.

Teaching

Courses Taught

- Advanced Dynamic Meteorology II (MET5312)
- Atmospheric Dynamics II (MET4302)
- Large-Scale Atmospheric Circulations (MET5340)
- Advanced Topics in Climatology (MET6155)
- * Physical Climatology (MET2101)

Doctoral Committee Chair

- Shin, C. S., graduate. (2012).
- * Castet, C., graduate. (2009).
- * Shin, J. H., graduate. (2007).
- Sejas, S. A., doctoral candidate.

Doctoral Committee Member

- Schenkel, B. A., graduate. (2012).
- Guimond, S. R., graduate. (2010).
- * Taylor, P. C., graduate. (2009).
- * Lin, L., graduate. (2009).
- * Bejarano-Avenda, L. F., graduate. (2006).
- You, Y., doctoral candidate.

Master's Committee Chair

- Sejas, S. A., graduate. (2011).
- * Brodowski, C., graduate. (2008).
- * Castet, C., graduate. (2005).
- * Pologne, L., graduate. (2005).
- Albert, O. S., student.
- Hussein, A. A., student.
- Liang, Z., student.

Barton, C., student. (2012).

Master's Committee Member

West, R. R., graduate. (2012).

* Keeling, T. B., graduate. (2009).

* Veenhuis, B. A., graduate. (2009).

Research and Original Creative Work

Publications

Refereed Journal Articles

Song, X., Zhang, G. J., & Cai, M. (submitted). Quantifying Contributions of Climate Feedbacks to Tropospheric Warming in the NCAR CCSM3.0. *Climate Dynamics*. Manuscript submitted for publication.

Zhang, Q., Shin, C-S, van den Dool, H., & Cai, M. (submitted). CFSv2 Prediction Skill of Stratospheric Anomalies. *Climate Dynamics*. Manuscript submitted for publication.

Deng, Y., Park, T-W, & Cai, M. (in press). Radiative and Dynamical Forcing of the Surface and Atmospheric Temperature Anomalies Associated with the Northern Annular Mode. *Journal of Climate*.

Taylor, P. C., Cai, M., Hu, A., Meehl, J., Washington, W., & Zhang, G. (in press). A Decomposition of Feedback Contributions to Polar Warming Amplification. *Journal of Climate*.

Cai, M., & Huang, B. (2012). A New Look at the Physics of Rossby Waves: A Mechanical-Coriolis Oscillation. *Journal of Atmospheric Science*, 70, 303-316. doi:10.1175/JAS-D-12-094.1

Cai, M., & Tung, Ka-Kit. (2012). Robustness of Dynamical Feedbacks from Radiative Forcing: 2% Solar versus 2×CO₂ Experiments in an Idealized GCM. *Journal of the Atmospheric Sciences*, 69(7), 2256-2271. doi:10.1175/JAS-D-11-0117.1

Deng, Y., Park, Tae-Won, & Cai, M. (2012). Process-based decomposition of the global surface temperature response to El Niño in boreal winter. *Journal of the Atmospheric Sciences*, 69(5), 1706-1712. doi:10.1175/JAS-D12-023.1

- Li, Q., Ren, R-C, Cai, M., & Wu, G. (2012). Attribution of the summer warming since 1970s in Indian Ocean Basin to the inter-decadal change in the seasonal timing of El Niño decay phase. *Geophysical Research Letters*, *10*, 347-352. doi: 10.1029/2012GL052150
- Park, Tae-Won, Deng, Y., & Cai, M. (2012). Feedback attribution of the El Niño--Southern Oscillation--related atmospheric and surface temperature anomalies. *Journal of Geophysical Research: Atmospheres (1984--2012)*, *117(D23)*, D23101. doi: 10.1029/2012JD018468
- Ren, R-C, Cai, M., Xiang, C., & Wu, G. (2012). Observational evidence of the delayed response of stratospheric polar vortex variability to ENSO SST anomalies. *Climate dynamics*, *38(7)*, 1345-1358. doi:10.1007/s00382-011-1137-7
- Taylor, P. C., Ellingson, R. G., & Cai, M. (2011). Seasonal variations of climate feedbacks in the NCAR CCSM3. *Journal of Climate*, *24(13)*, 3433-3444. doi: 10.1175/2011JCLI3862.1
- Taylor, P. C., Ellingson, R. G., & MING, C. (2011). Geographical distribution of climate feedbacks in the NCAR CCSM3. 0. *Journal of Climate*, *24(11)*, 2737-2753. doi: 10.1175/2010JCLI3788.1
- Lu, J., & Cai, M. (2010). Quantifying contributions to polar warming amplification in an idealized coupled general circulation model. *Climate Dynamics*, *34(5)*, 669-687. doi: 10.1007/s00382-009-0673-x
- * Cai, M., & Lu, J. (2009). A new framework for isolating individual feedback processes in coupled general circulation climate models. Part II: Method demonstrations and comparisons. *Climate Dynamics*, *32(6)*, 887-900. doi:10.1007/s00382-008-0424-4
- * Cai, M., Shin, Chul-Su, van den Dool, H. M., Wang, W., Saha, S., & Kumar, A. (2009). The Role of Long-Term Trends in Seasonal Predictions: Implication of Global Warming in the NCEP CFS. *Weather and Forecasting*, *24(4)*, 965-973. doi: 10.1175/2009WAF2222231.1
- * Lu, J., & Cai, M. (2009). Seasonality of polar surface warming amplification in climate simulations. *Geophysical Research Letters*, *36*, L16704-L16704. doi: 10.1029/2009GL040133
- * Lu, J., & Cai, M. (2009). Stabilization of the atmospheric boundary layer and the muted

global hydrological cycle response to global warming. *Journal of Hydrometeorology*, 10(1), 347-352. doi:10.1175/2008JHM1058.1

- * Ren, R., Wu, G., Cai, M., & Yu, J. (2009). Winter season stratospheric circulation in the SAMIL/LASG general circulation model. *Advances in Atmospheric Sciences*, 26(3), 451-464.
- * Kalnay, E., Cai, M., Nunez, M., & Lim, Y. (2008). Impacts of urbanization and land surface changes on climate trends. *International Association for Urban Climate*, 27, 5-9.
- * Lim, Young-Kwon, Cai, M., Kalnay, E., & Zhou, L. (2008). Impact of vegetation types on surface temperature change. *Journal of Applied Meteorology and Climatology*, 47(2), 411-424. doi:10.1175/2007JAMC1494.1
- * Nuñez, M. N., Ciapessoni, H. H., Rolla, A., Kalnay, E., & Cai, M. (2008). Impact of land use and precipitation changes on surface temperature trends in Argentina. *Journal of Geophysical Research*, 113(D6), D06111. doi:10.1029/2007JD008638
- * Ren, R. -C, & Cai, M. (2008). Meridional and downward propagation of atmospheric circulation anomalies. Part II: Southern Hemisphere cold season variability. *Journal of the Atmospheric Sciences*, 65(7), 2343-2359. doi:10.1175/2007JAS2594.1
- * Yang, Shu-Chih, Kalnay, E., Cai, M., & Rienecker, M. M. (2008). Bred vectors and tropical Pacific forecast errors in the NASA coupled general circulation model. *Monthly Weather Review*, 136(4), 1305-1326. doi:10.1175/2007MWR2118.1
- * Cai, M., Yang, S., Van den Dool, H. M., & Kousky, V. E. (2007). Dynamical implications of the orientation of atmospheric eddies: a local energetics perspective. *Tellus Series A - Dynamic Meteorology and Oceanography*, 59(1), 127-140. doi:10.1111/j.1600-0870.2006.00213.x
- * Cai, M., & Lu, J. (2007). Dynamical greenhouse-plus feedback and polar warming amplification. Part II: meridional and vertical asymmetries of the global warming. *Climate Dynamics*, 29(4), 375-391. doi:10.1007/s00382-007-0238-9
- * Cai, M., & Ren, R-C. (2007). Meridional and downward propagation of atmospheric circulation anomalies. Part I: Northern Hemisphere cold season variability. *Journal of the Atmospheric Sciences*, 64(6), 1880-1901. doi:10.1175/JAS3922.1

- * Pielke, Roger, Sr., Nielsen-Gammon, J., Davey, C., Angel, J., Bliss, O., Doesken, N., Cai, M., Fall, S., Niyogi, D., Gallo, K., Hale, R., Hubbard, K. G., Lin, X., Li, H., & Raman, S. (2007). Documentation of uncertainties and biases associated with surface temperature measurement sites for climate change assessment. *Bulletin of the American Meteorological Society*, 88(6), 913-928. doi:10.1175/BAMS-88-6-913
- * Ren, R-C, & Cai, M. (2007). Meridional and vertical out-of-phase relationships of temperature anomalies associated with the Northern Annular Mode variability. *Geophysical Research Letters*, 34(7), L07704. doi:10.1029/2006GL028729
- * Cai, M. (2006). Dynamical greenhouse-plus feedback and polar warming amplification. Part I: A dry radiative-transportive climate model. *Climate Dynamics*, 26(7-8), 661-675. doi:10.1007/s00382-005-0104-6
- * Cai, M., & Ren, R. (2006). 40-70 Day Meridional Propagation of Global Circulation Anomalies. *Geophysical Research Letters*, 33(6), L06818. doi:10.1029/2005GL025024
- * Kalnay, E., Cai, M., Li, H., & Tobin, J. (2006). Estimation of the impact of land-surface forcings on temperature trends in eastern United States. *Journal of Geophysical Research-Atmospheres*, 111(D6), D06106-D06106. doi:10.1029/2005JD006555
- * Rongcai, R., & Cai, M. (2006). Polar vortex oscillation viewed in an isentropic potential vorticity coordinate. *Advances in Atmospheric Sciences*, 23(6), 884-900. doi:10.1007/s00376-006-0884-6
- * Yang, S., Cai, M., Kalnay, E., Rienecker, M., Yuan, G., & Toth, Z. (2006). ENSO bred vectors in coupled ocean-atmosphere general circulation models. *Journal of Climate*, 19(8), 1422-1436. doi:10.1175/JCLI3696.1
- * Cai, M. (2005). Dynamical amplification of polar warming. *Geophysical Research Letters*, 32(22), L22710. doi:10.1029/2005GL024481
- * Cai, M., & Kalnay, E. (2005). Can reanalysis have anthropogenic climate trends without model forcing? *Journal of Climate*, 18(11), 1844-1849. doi:10.1175/JCLI3347.1
- * Lim, Y., Cai, M., Kalnay, E., & Zhou, L. (2005). Observational evidence of sensitivity of surface climate changes to land types and urbanization. *Geophysical Research Letters*, 32(22), L22712. doi:10.1029/2005GL024267

- * Cai, M., & Kalnay, E. (2004). Response to the comments by Vose et al. and Trenberth - Impact of land-use change on climate. *Nature*, 427(6971), 214-214. doi: 10.1038/427214a
- * Pena, M., Cai, M., & Kalnay, E. (2004). Life span of subseasonal coupled anomalies. *Journal of Climate*, 17(7), 1597-1604. doi:10.1175/1520-0442(2004)017 [1597:LSOSCA>2
- * Cai, M., Kalnay, E., & Toth, Z. (2003). Bred vectors of the Zebiak-Cane model and their potential application to ENSO predictions. *Journal of Climate*, 16(1), 40-56. doi: 10.1175/1520-0442(2003)016[0040:BVOTZC>2
- * Corazza, M., Kalnay, E., Patil, D., Yang, S., Morss, R., Cai, M., Szunyogh, I., Hunt, B., & Yorke, J. (2003). Use of the breeding technique to estimate the structure of the analysis "errors of the day". *Nonlinear Processes in Geophysics*, 10(3), 233-243.
- * Kalnay, E., & Cai, M. (2003). Impact of urbanization and land-use change on climate change. *Nature*, 423, 528.
- * Pena, M., Kalnay, E., & Cai, M. (2003). Statistics of locally coupled ocean and atmosphere intraseasonal anomalies in Reanalysis and AMIP data. *Nonlinear Processes in Geophysics*, 10(3), 245-251.

Contracts and Grants

Contracts and Grants Funded

- Cai, Ming (PI). (Sep 2010–Sep 2013). *Collaborative Research: Process-Resolving Decomposition*. Funded by U. S. Department of Energy. (DE-SC0004974). Total award \$210,432.
- Cai, Ming (PI). (Aug 2010–Jul 2013). *Dynamical Climate Predictability of the NCEP CFS in the*. Funded by National Oceanic and Atmospher. (NA10OAR4310168). Total award \$406,326.
- * Cai, Ming (PI). (Nov 2008–Apr 2014). *Collaborative Research: Understanding Climate Feedbacks*. Funded by National Science Foundation. (0833001). Total award \$503,788.

- * Cai, Ming (PI). (Jan 2008–Dec 2008). *Stratosphere-To-Troposphere Transfer of Angular*. Funded by National Science Foundation. (0741357). Total award \$50,132.
- * Cai, Ming (PI). (May 2006–Apr 2010). *A Comprehensive Diagnostic Study on the Dynamics of the*. Funded by National Oceanic and Atmospher. (NA06OAR4310090). Total award \$306,950.
- * Cai, Ming (PI). (Dec 2005–Dec 2008). *Coupled Ocean-Atmosphere Breeding for Ensemble*. Funded by University of Maryland Colleg. (Z621601). Total award \$45,127.
- * Jin, Fei-Fei (PI), & Cai, M. (Oct 2004–Jun 2006). *Dynamics of Low-Frequency Modes of the Atmospheric Circu*. Funded by National Science Foundation. (ATM-0424799). Total award \$367,616.
- * Cai, Ming (PI). (Jul 2004–Dec 2005). *Seasonal and Geographical Impact of Land-Use on Climate*. Funded by National Science Foundation. (0403211). Total award \$126,271.
- * Cai, Ming (PI). (Jun 2004–May 2007). *Lingering Memory and Extreme Weather: Climatology, Varia*. Funded by National Oceanic and Atmospher. (NA04OAR4310050). Total award \$233,161.