

Zhengyu Liu

Curriculum Vitae

Max Thomas Professor of Climate Dynamics
 Atmospheric Science Program, Department of Geography
 The Ohio State University, 154 N. Oval Mall, Columbus, OH 43210
 Ph: (614) 292-7948, Email: liu.7022@osu.edu
<https://geography.osu.edu/people/liu.7022>

Education

Ph.D., Physical Oceanography, MIT (Advisor: J. Pedlosky)	1991
M.S., Dynamic Meteorology, Chinese Academy of Science	1985
B.S., Applied Mathematics, Nanjing Institute of Meteorology, China	1982

Professional Appointments

2017-	Professor, Byrd Polar and Climate Research Center, The Ohio State University
2017-	Max Thomas Professor of Climate Dynamics, The Ohio State University
2002-2017	Professor, University of Wisconsin-Madison
2002-2011	Director, Center for Climatic Research, UW-Madison
1999-2001	Associate Director, Center for Climatic Research, UW-Madison
1998-2001	Associate Professor, University of Wisconsin-Madison
1993-1998	Assistant Professor, University of Wisconsin-Madison
1991-1993	Postdoctoral Fellow, Princeton University
1985-1987	Lecturer of Meteorology, Graduate School, Chinese Academy of Sciences

Research Interests

Ocean-atmosphere-land interactions and climate dynamics
 Dynamics of oceanic circulation
 Paleoclimate modeling
 Earth system modeling

Honors

Fellow, American Association for the Advancement of Science, 2020
 Fellow, American Meteorological Society, 2012
 Fellow, American Geophysical Union, 2010
 Vilas Associate Award-UW-Madison, 2000-2003
 Young Investigator Award /Office of Naval Research, 1995
 NOAA Postdoctoral Fellowship on Climate Change, 1991

Other Scholarly Activities

Advisory Committee, Chinese Quaternary Science Society, 2016-
 Associate Editor, Transaction of Atmospheric Sciences, 2015-
 Associate Editor, Earth Environmental Sciences, 2014-
 Associate Editor, Journal of Meteorological Research, 2014-
 Advisory Committee, Chinese Climate Modeling Consortium, 2012-2018
 Chinese Ministry of Education, 1000-talent scholar, Peking University, 2011
 Advisory Committee, Earth Environmental Institute, Chinese Academy of Sciences, 2010-
 Visiting scientist, GFDL/NOAA, 2009
 Senior visiting scientist, MPI/Hamburg/Germany, 2008-2009
 Faculty fellowship award, NCAR, 1995,1996, 2002, 2008
 Member, Grand Challenge Task force, DOE, 2008

Member, Post-ESH working group, 2007
 Member, NSF paleo-proxy working group, 2005
 Co-chair, CCSM paleoclimate working group, 2005-2008
 Member, U.S. CLIVAR-Pacific steering committee, 2004
 Member, Tropical past climate working group, 2003
 Senior Visiting Professor Award, The University of Tokyo, Japan, 2002
 Chinese Ministry of Education, Yangtze scholar, Ocean University of China, 2001
 Member, Marine Earth System History steering committee, 2001
 Member, Shallow STC and Climate working group, 2000
 Honorary Professor, Institute of Environmental Sciences, Chinese Academy of Sciences, 00-
 Excellent Overseas Chinese Scientist Award, Chinese NSF, 2000
 Vilas Associate Professor, UW-Madison, 1999
 Member, U.S. PAGE/CLIVAR working group, 1999
 Member, Graduate School Research Committee, UW-Madison, 1999-2002
 Member, Steering Committee, Asian Partnership Program/UW-Madison, 1999-2004
 Visiting Scientist, IPRC, University of Hawaii, 1999
 Member, Advisory Panel of NCAR Supercomputing, 1998-00

Student Advising

Ph.D students

Boyin Huang, E. Bayler, S. Shin, D. Lee, Yafang Zhong, Wei Liu, Yun Liu, Feng He, Guangshen Chen, Xiaojie Zhu, Na Wen, Jiayu Zhang, Fuyao Wang, Jiang Zhu, Lianhua Zhu, Feiyu Lu, Sifan Gu, Shan Li, Zhenyao Lu, Chengfei He, Jian Guan, Jing Han, Yishuai Jin, Chenyu Zhu, Yuchu Zhao, Sheng Wu, Xiong Deng, Jingzhe Sun, Yu Gao, Tianying Liu, Karen Russ, Yuntao Bao, Lingwei Li, Jinbo Du, Kefan Chen

M.S. students

K. Sirtangnan, Liping Zhang, S. Ashutosh, W. Lewis, A. Lennan, Lihua Wang, T. Casal, E. Hokonson, E. Ong, J-P, Agenti, Xinrong Wu, Xuefeng, Zhang, M. Wehrenberg, Kuniaki Inoue, Yan Yu, Haran Liu, Jinxuan Zhu, Lingwei Li, Wilton Aguiar

Post doctoral advisees

S. Borisov, Y. Golubev, Lixin Wu, S. Vavrus, Weimin Xu, Dongxiao Wang, T. Inui, Haijun Yang, M. Stephens, Hui Wang, Qiong Zhang, Xiaodong Liu, Li Li, M. Notaro, S. Kalpan, Yu Liu, R. Booth, Yi Wang, Guangshen Chen, Shu Wu, Xinyao Ron, Libin Yan, Zhifu Wang, Shuang Yang, Jian Guan, Yishuai Jin, Chengyu Zhu, Qin Wen

Citation Information

Source: Web of Science (as of Jan. 2021)

Total publications: 367

H-index: 64

Total citations: 15,119 (13,860 without self-citation),

Total citing articles: 10,183 (9,903 without self-citation)

Source: Google Scholar Citation (as of March 17, 2022)

	All	Since 2016
<u>Citations</u>	20395	9595
<u>h-index</u>	74	45

Courses Taught

UW-Madison

AOS171: Global Climate Change

AOS528: Past Climate Changes

AOS611: Geophysical Fluid Dynamics II: Large-Scale Dynamics

AOS660: Introduction to Physical Oceanography.

AOS761: Dynamics of General Oceanic Circulation.

AOS760: Ocean-Atmosphere Interaction and Global Climate Variability

AOS801: Advanced Topics in Ocean Dynamics

AOS801: Data Assimilation and Weather/Climate Prediction

AOS900: Seminar in Classical Problems in Meteorology

AOS901: Seminar in Advanced Dynamics

AOS910: Seminar in Global Climate

AOS960: Seminar in Oceanography

OSU

ASP5952: Dynamic Meteorology I

ASP5951: Dynamic Meteorology II

GEOG8902: Combining Data and Model: Data Assimilation

GEOG8901: Global Climate Change

Publications (first author as my student/postdoc underlined)**In Press**

- Bova, S., Y. Rosenthal, **Z. Liu**, M. Yan, A. J. Broccoli, S. P. Godad, C. Zeng and W. Zheng 2022: Response to Laepple et al. – SAT method precludes the reconstruction of interglacial thermal maxima. *Nature*, in press
- Sun H., L. Lei, **Z. Liu**, L. Ning and Z-M Tan, 2022: An Analog Offline EnKF for Paleoclimate Data Assimilation. *J. Adv. Modeling Earth Systems*, in press

2022

- Chen K., L. Ning, **Z. Liu**, J. Liu, M. Yan, W. Sun, C. Jin, and Z. Shi, 2022: Nonlinear responses of droughts over China to volcanic eruptions at different drought phases. *Geophys. Res. Lett.* 10.1029/2021GL096454
- Qin, Y., L. Ning, L. Li, **Z. Liu**, J. Liu, M. Yan, K. Chen, J. Xue, L. Wang and C. Li, 2022: Assessing the modern multi-decadal scale aridification over the Northern China from a historical perspective. *J. Geophys. Res.-Atmos.*, 10.1029/2021JD035622
- Zhang, M., Y. Liu, J. Zhu, Z. Wang and **Z. Liu**, 2022: Impact of Dust on climate and AMOC during the Last Glacial Maximum Simulated by CESM1.2. *Geophys. Res. Lett.*, e2021GL096672
- Buckingham, F., S. A. Carolin, J.W. Partin, J.F. Adkins, K.M. Cobb, C.C. Day, Q. Ding, C. He, **Z. Liu**, B. Otto-Bliesner, W.H.G. Roberts, S. Lejau and J. Malang, 2022: Termination 1 Millennial-scale Rainfall Events over the Sunda Shelf. *Geophys. Res. Lett.*, <https://doi.org/10.1029/2021GL096937>
- Wen, Q., H. Yang and **Z. Liu**, 2022: Possible Thermal Effect of Tibetan Plateau on the Atlantic Meridional Overturning Circulation. *Geophys. Res. Lett.*, 49, e2021GL095771. <https://doi.org/10.1029/2021GL095771>

2021

- He C., **Z. Liu**, B. L. Otto-Bliesner, E. C. Brady, C. Zhu, R. Thomas, P. U. Clark, J. Zhu, A. Jahn, S. Gu, J. Zhang, J. Nusbaumer, D. Noone, H. Cheng, Y. Wang, M. Yan and Y. Bao, 2021: The hydroclimate footprint accompanying pan-Asian monsoon water isotope evolution during the last deglaciation. *Sci. Adv.* 10.1126/sciadv.abe2611
- Bova S., Y. Rosenthal, **Z. Liu**, S. Godal and M. Yan, 2021: Seasonal origin for the Holocene and last interglacial thermal maximum. *Nature* **589**, 548-553, 10.1038/s41586-020-03155-x
- Bova, S. Y. Rosenthal, **Z. Liu**, M. Yan, A. J. Broccoli, S. P. Godad and C. Zeng, 2021: Reply to MA: Concerns on roles of polar sea-ice variability. *Nature* **600**, 10.1038/s41586-021-03931-3
- He, C., **Z. Liu**, B. L. Otto-Bliesner, E.C. Brady, C. Zhu, R. Tomas, C. Buizert and J. Severinghaus, 2021: Abrupt Heinrich Stadial 1 Cooling Missing in Greenland Oxygen Isotopes. *Sci. Adv.*, 10.1126/sciadv.abh100
- He C., **Z. Liu**, B. L. Otto-Bliesner, E.C. Brady, C. Zhu, R. Tomas, S. Gu, J. Han and Y. Jin, 2021: South China hydroclimate variability heavily contributed by autumn rainfall during the last deglaciation. *Nat Commun.* **12**, 5875. 10.1038/s41467-021-26106-0.
- Cheng J., H. Wu, **Z. Liu**, P. Gu, J. Wang, C. Zhao, Q. Li, H. Chen, H. Lu, H. Hu, Y. Gao, M. Yu and Y. Song, 2020: Vegetation feedback leads to delayed eco-environmental response to East Asian Summer Monsoon rainfall during Holocene. *Nature Comm.* 10.1038/s41467-021-22087-2
- Buizert C., T.J. Fudge, W. H. G. Roberts, E. J. Steig, S. Sherriff-Tadano, C. Ritz, E. Lefebvre, J. Edwards, K. Kawamura, I. Oyabu, H. Motoyama, E. C. Kahle, T. R. Jones, A. Abe-Ouchi, T. Obase, C. Martin, H. Corr, J. P. Severinghaus, R. Beaudette, J. A. Epifanio, E. J. Brook, K.

- Martin, J. Chappellaz, S. Aoki, T. Nakazawa, T. A. Sowers, R. Alley, J. Ahn, M. Sigl, M. Severi, N. W. Dunbar, A. Svensson, J. Fegyveresi, C. He, **Z. Liu**, J. Zhu, B. Otto-Bliesner, V. Y. Lipenkov, T. Kameda, M. Kageyama and J. Schwander: 2021: Antarctic-wide surface temperature and elevation during the Last Glacial Maximum. *Science* **372**, 1097-1101. 10.1126/science.abd2897
- Jin Y. and **Z. Liu**, 2021: On the formation mechanism of seasonal persistence barrier. *J. Clim.* **34**, 479-494.
- Jin Y. and **Z. Liu**, 2021: A theory of Spring Persistence Barrier on ENSO. Part II: Persistence barriers in SST and ocean heat content. *J. Clim.* **34**, 5555–5564, 10.1175/JCLI-D-20-0820.1
- Jin, Y., **Z. Liu**, M. McPhaden, 2021: A Theory of Spring Persistence Barrier on ENSO. Part III: The role of Tropical Pacific Ocean Heat Content. *J. Clim.* **34**, 8567-8577
- Wen, Q., C. Zhu, Z. Han, H. Yang and **Z. Liu**, 2021: Can the topography of Tibetan Plateau affect the Antarctic Bottom Water. *Geophys. Res. Lett.*, 10.1029/2021GL092448.
- Wen Q., Z. Han, H. Yang, J. Cheng, **Z. Liu** and J. Liu, 2021: Influence of Tibetan Plateau on the North American Summer Monsoon Precipitation. *Clim. Dyn.*, 10.1007/s00382-021-05857-y
- Zhang H., X. Zhang, Y. Cai, A. Sinha, C. Spötl, J. Baker, G. Kathayat, Y. Tian, J. Lu, Z. Wang, J. Zhao, X. Jia, W. Du, Y. Ning, Z. An, R. L. Edwards, **Z. Liu** and H. Cheng, 2021: A data-model comparison pinpoints Holocene spatiotemporal pattern of East Asian summer monsoon. *Quat. Sci. Rev.* **261**, 10.1016/j.quascirev.2021.106911
- Wang, P., Y. Jin and **Z. Liu**, 2021: Diurnal predictability barrier for weather forecast. *Mon. Wea. Rev.* **149**, 1715-1723
- Liu Z.**, B. L. Otto-Bliesner, P. U. Clark, J. Lynch-Stieglitz, J. and M. Russell, 2021: SynTRACE-21: Synthesis of Transient Climate Evolution of the last 21,000 years. *PAGES newsletter*, 10.22498/pages.29.1.13.
- Gu, S., **Z. Liu**, D. W. Oppo, J. Lynch-Stieglitz, A. Jahn, J. Zhang, K. Lindsay and L. Wu: 2021: Remineralization dominating the $\delta^{13}\text{C}$ decrease in the mid-depth Atlantic during the last deglaciation. *Earth & Planetary Sci. Lett.* **571**, 10.1016/j.epsl.2021.117106
- Zhang, Z., G. Li, Y. Cai, **Z. Liu** and Z. An, 2021: Variation of summer precipitation $\delta^{18}\text{O}$ on the Chinese Loess Plateau since the last interglacial. *J. Quaternary Science*, 10.1002/jqs.3358
- Liu, W., **Z. Liu** and S. Li, 2021: The driving mechanisms on Southern Ocean upwelling change during the last deglaciation. *Geosciences*, *11*, 266-; 10.3390/geosciences11070266.
- Zhu, C. **Z. Liu**, S. Zhang and L. Wu, 2021: Global oceanic overturning circulation forced by the competition between greenhouse gases and continental ice sheets during last deglacial. *J. Clim.*, 10.1175/JCLI-D-21-0125.1
- Li, L., **Z. Liu**, C. Zhu, C. He and B. Otto-Bliesner, 2021: Shallowing glacial Antarctic Intermediate water by changes in sea ice and hydrological cycle. *Geophys. Res. Lett.*, 10.1029/2021GL094317
- Li, L., **Z. Liu**, J. Lynch-Stieglitz, C. He, S. Gu, J. Zhang and B. Otto-Bliesner, 2020: Testing Methods for Reconstructing Glacial Antarctic Circumpolar Current Transport in an Isotope-enabled Climate Model. *Paleoceanography and Paleoclimatology* **36**, 10.1029/2020PA004183.
- Cheng, H., Y. Xu, X. Dong, J. Zhao, H. Li, J. Baker, A. Sinha, C. Spötl, H. Zhang, W. Du, B. Zong, X. Jia, G. Kathayat, D. Liu, Y. Cai, X. Wang, N. M. Strikis, F. W. Cruz, A. S. Auler, A. K. Gupta, R. K. Singh, S. Jaglan, S. Dutt, Z. Liu and R. L. Edwards, 2021: Onset and termination of Heinrich Stadial 4 and the underlying climate dynamics. *Communications Earth & Environment*. **2**, 230, <https://doi.org/10.1038/s43247-021-00304-6>
- Du X., J. M. Russell, **Z. Liu**, B. L. Otto-Bliesner, Y. Gao, C. Zhu, D. W. Oppo, M. Mohtadi, Y. Yan, V. V. Galy and C. He, 2021: Deglacial trends in Indo-Pacific Warm Pool hydroclimate in an isotope-enabled Earth system model and implications for isotope-based paleoclimate reconstructions. *Quat. Sci. Res.* **270**, 10.1016/j.quascirev.2021.107188

Tabor, C., M. Lofverstrom; J. Oster, B. Wortham, C. de Wet, I. Montañez, A. Rhoades, C. Zarzycki, C. He, **Z. Liu**: 2021: A Mechanistic Understanding of Oxygen Isotopic Changes in the Western United States at the Last Glacial Maximum. *Quat. Sci. Rev.* **274**, 10.1016/j.quascirev.2021.107255

2020

Zhu, C. and **Z. Liu**, 2020: Weakening Atlantic Overturning Circulation causes South Atlantic salinity pileup. *Nat. Clm. Change*, 10.1038/s41558-020-0897-7

Jian Z., Y. Wang, H. Dang, D. W. Lea, **Z. Liu**, H. Jin and Y. Yin, 2020: Half-precessional cycle of thermocline temperature in the western equatorial Pacific and its bi-hemispheric dynamics. *Proc. Natl Acad. Sci. USA*, 10.1073/pnas.1915510117

Chen, K., L. Ning, **Z. Liu**, J. Liu, M. Yan, W. Sun et al., 2020: One drought and one volcanic eruption influenced the history of China: The late Ming Dynasty mega-drought. *Geophys. Res. Lett.*, **47**, e2020GL088124. 10.1029/2020GL088124 (highlighted by Nature: <https://www.ature.com/articles/d41586-020-02467-2>)

Chen, K., L. Ning, **Z. Liu**, J. Liu, M. Yan, W. Sun, B. Liu, 2020: The Influences of tropical volcanic eruptions with different magnitudes on the persistent droughts over the eastern China. *Atmosphere* **11**, 210-, 10.3390/atmos11020210

Han, J., L. Back, **Z. Liu** and X. Wen, 2020: How far poleward can the seasonal precipitation maxima over land extend under high obliquity? *Clim. Dyn.*, 10.1007/s00382-020-05225-2

Jin, Y., Z. Lu, and **Z. Liu**, 2020: Controls of Spring Persistence Barrier strength in different ENSO regimes and implications for Twenty-First-Century change. *Geophys. Res. Lett.* **47**, 10.1029/2020GL088010

Zhang S., **Z. Liu**, X. Zhang, X. Wu, G. Han, C. Liu, Y. Zhao, X. Yu, M. Li, Z. Wang, Y. Liu, S. Wu and F. Lu, 2020: Coupled data assimilation and parameter estimation in coupled ocean-atmosphere models: a review. *Clim. Dyn.* **54**, 5127–5144

Ning, L., K. Chen, J. Liu, **Z. Liu**, M. Yan, W. Sun, C. Jin and Z. Shi, 2020: How do volcanic eruptions influence decadal megadroughts over eastern China? *J. Clim.*, **33**, 8195-8207

Joos, F., R. Spalni, B. Stocker, S. Lienert, J. Muller, H. Fischer, J. Schmitt, I. Prentice, B. Otto-Bliesner and **Z. Liu**, 2020: N₂O changes from the Last Glacial Maximum to the preindustrial - part II: terrestrial N₂O emissions and carbon-nitrogen cycle interactions. *Biogeosciences* **17**, 3511-3543.

Gao Y., **Z. Liu** and Z. Lu 2020: Dynamic Effect of Ice Sheet Topography on East Asian Summer Monsoon during the Last Deglaciation. *J. Clim.* **33**, 6929-6944

Guan J., **Z. Liu** and G.S. Chen, 2020: Moisture Source tagging confirming the Polar amplification effect in amplifying the temperature- $\delta^{18}\text{O}$ temporal slope since the LGM. *Atmosphere*, doi:10.3390/atmos11060610

Yan, M., **Z. Liu**, L. Ning and J. Liu, 2020: Holocene EASM-EAWM relationship across different timescales in CCSM3. *Geophys. Res. Lett.* **47**, 10.1029/2020GL088451

Zhang, H., **Z. Liu**, E. Constantinescu and R. Jacob, 2020: Stability Analysis of Interface Conditions for Ocean-Atmosphere Coupling. *J. Scientific Computing* **84**, 1-25.

Tabor, C., B. Otto-Bliesner and **Z. Liu**, 2020: Speleothems of South American and Asian monsoons influenced by a Green Sahara. *Geophys. Res. Lett.*, **47**, 10.1029/2020GL089695

Gu, S., **Z. Liu**, D. W. Oppo, J. Lynch-Stieglitz, A. Jahn; J. Zhang and L. Wu, 2020: Assessing the potential capability of reconstructing glacial Atlantic water masses and AMOC using multiple proxies in CESM. *Earth & Planetary Sci. Lett.* **541**, 10.1016/j.epsl.2020.116294

Wu, S. and **Z. Liu**, 2020: Decadal variability in North Pacific and North Atlantic under global warming: the weakening response and its mechanism. *J. Clim.* **33**, 9181-9193.

Sun, J., **Z. Liu**, F. Lu, W. Zhang, Y. Zhao and S. Zhang, 2020: Quantitatively isolating extratropical atmospheric impact on the tropical Pacific interannual variability in coupled climate model. IEEE Access, 0.1109/ACCESS.2020.3021801

- Jin Y. and **Z. Liu**, 2020: A theory of Spring Persistence Barrier on ENSO. Part I: The role of ENSO period.. *J. Clim.* **33**, 10.1175/JCLI-D-20-0540.1
- Zhu, J., C. J. Poulsen, B. L. Otto-Bliesner, **Z. Liu**, E. Brady and D. Noone, 2020: Simulation of early Eocene water isotopes using an Earth system model and its implication for past climate reconstruction. *Earth & Planetary Sci. Lett.*, 10.1016/j.epsl.2020.116164
- He, C., **Z. Liu**, J. Zhu, J. Zhang, S. Gu, B. L. Otto-Bliesner, B. Esther, C. Zhu, Y. Jin and J. Sun, 2020: North Atlantic subsurface temperature response controlled by effective freshwater input in "Heinrich" events. *Earth & Planetary Sci. Lett.*, 10.1016/j.epsl.2020.116247.
- Gu, S., **Z. Liu**, L. Wu, 2020: Timescale dependence of the meridional coherence of Atlantic Meridional Overturning Circulation. *J. Geophys. Res.-Ocn.*, 10.1029/2019JC015838.
- Sun, J., **Z. Liu**, F. Lu, W. Zhang and S. Zhang, 2020: Strongly Coupled Data Assimilation Using Leading Averaged Coupled Covariance (LACC). Part III: Real World Data Assimilation. *Mon. Wea. Rev.*, 10.1175/MWR-D-19-0304.1
- Hu, Y., Y. Xia, **Z. Liu**, Y. Wang, Z. Lu and T. Wang, 2020: Distorted Pacific-North American Teleconnection at the Last Glacial Maximum. *Clim. Past* **16**, 199–209, 10.5194/cp-16-199-2020.
- Aguiar, W., L. F. Prado, I. Wainer, **Z. Liu**, A. Montenegro, K. J. Meissner and M. M. Mata, 2020: Freshwater control on early-Holocene South America Monsoon. *Quat. Sci. Rev.*, 10.1016/j.quascirev.2020.10649
- Du J., C. Li and **Z. Liu**, 2020: Study on three-dimensional structure and signal propagation features of PDO based on heat content. *J. Marine Meteorology*, 40 (1):1 - 11. DOI:10.19513 / j.cnki.issn2096 – 3599.2020.01.001. (in Chinese)
- Cheng, J., Y. Ma, H. Wu, H. Long and **Z. Liu**, 2020: Migration of Afro-Asian monsoon fringe since Last Glacial Maximum. *Frontiers in Earth Science*, 10.3389/feart.2020.00322
- Tabor, C., B. Otto-Bliesner and **Z. Liu**, 2020: Speleothems of South American and Asian monsoons influenced by a Green Sahara. *Geophys. Res. Lett.*, 10.1029/2020GL089695
- Zhao, C., E. J. Rohling, **Z. Liu**, X. Yang, E. Zhang, J. Cheng, Z.H. Liu, Z. An, X. Yang, X. Feng, X. Sun, C. Zhang, T. Yan, H. Long, H. Yan, Z. Yu, W. Liu, S-Y Yu and J Shen: 2020: Possible obliquity-forced warmth in southern Asia during the last glacial stage. *Science Bulletin*, 10.1016/j.scib.2020.11.016

2019

- He, C., **Z. Liu** and A. Hu, 2019: The transient response of atmospheric and oceanic heat transports to anthropogenic warming. *Nat. Clim. Change* **9**, 222-226.
- Liu, Z.**, Y. Jin and X. Rong, 2019: A theory for seasonal predictability barrier: threshold, timing and intensity. *J. Clim.* **32**, 423-443.
- Jin, Y., **Z. Liu**, X. Rong, 2019: General Seasonal Phase-locking of Variance and Persistence: Application to Tropical Pacific, North Pacific and Global Ocean. *Clim. Dyn.* **53**, 2825-2842.
- Gu, S., **Z. Liu**, A. Jahn, J. Rampfer, J. Zhang and F. Joos, 2019: Modeling neodymium isotopes in the ocean component of the community earth system model (CESM1) *J. Adv. Modeling Earth Systems* **11**, 624-640.
- Gu, S., **Z. Liu**, J. Lynch-Stieglitz, A. Jahn, J. Zhang, K. Lindsay, L. Wu, 2019: Assessing the ability of zonal $\delta^{18}\text{O}$ contrast in benthic foraminifera to reconstruct deglacial evolution of Atlantic Meridional Overturning Circulation, *Paleoceanography and Paleoclimatology* **34**, 800-812.
- Umling N.E., D.W. Oppo, P. Chen, J. Yu, **Z. Liu**, M. Yan, G. Gebbie, K. R. Pietro, Z.D. Jin, K.B. Costa, F.A.L. Toledo, D.C., Lund and M. Lacerra, 2019: Atlantic circulation and ice sheet influences on upper South Atlantic temperatures during the last deglaciation, *Paleoceanography and Paleoclimatology* **34**, 990-1005.
- Fang, C., F. Zheng, **Z. Liu** and J. Zhu, 2019: Decadal modulation of ENSO Spring Persistence Barrier by thermal damping processes in the observation. *Geophys. Res. Lett.* **46**, 6892-6899.

- Lu, Z. and **Z. Liu**, 2019: Orbital modulation of ENSO seasonal phase locking. *Clim. Dyn.* **52**, 4329-4350.
- Lu, Z., **Z. Liu**, G. Chen and J. Guan, 2019: Prominent precession-band variance in ENSO intensity over the last 300,000 years. *Geophys. Res. Lett.* **46**, 9786–9795.
- Feng, J., J. Li, F-F Jin, **Z. Liu** and S. Zhao, 2019: Effect of El Niño on the response ratio of Hadley circulation to different SST meridional structures. *Clim. Dyn.* **53**, 3877-3891.
- Zhao, Y., **Z. Liu**, F. Zheng and Y. Jin, 2019: EnKF parameter optimization for real world ENSO forecast in an intermediate coupled model. *Mon. Wea. Rev.* **147**, 1429-1445.
- Stevenson, S., B. Otto-Bliesner, E. Brady, J. Nusbaumer, C. Tabor, R. Tomas, D. Noone and **Z. Liu**, 2019: Volcanic eruption signatures in the isotope-enabled last millennium ensemble. *Paleoceanography and Paleoclimatology* **34**, 1534-1552.
- Brady, E., Stevenson, S., Bailey, D., **Liu, Z.**, Noone, D., Nusbaumer, J., et al, 2019: The connected isotopic water cycle in the Community Earth System Model version 1. *J. Adv. Modeling Earth Systems* **11**, 2547-2566.
- Yu X., S., Zhang, J. Li, L. Lu, **Z. Liu**, M. Li, H. Yu, G. H., X. Lin, L. Wu and P. Chang, 2019: A multiscale EnOI-like high-efficiency filter for coupled model data assimilation. *J. Adv. Modeling Earth Systems* **11**, 45-63.
- Wen N., **Z. Liu**, Y. Liu and L. Li, 2019: Response and mechanism of East Asian summer precipitation in the developing summer of ENSO: Direct impact of ENSO. *Clim. Dyn.* **52**, 6799-6815.
- Wan L., **Z. Liu**, J. Liu, W. Sun and B. Liu, 2019: On the linearity of the temperature response in Holocene: the spatial and temporal dependence. *Clim. Past* **15**, 1411-1425.
- Zhao, Y., X. Deng, S. Zhang, **Z. Liu** and C. Liu, 2019: Sensitivity determined simultaneous estimation for multiple parameters in coupled models: Part I: Based on single model component sensitivity. *Clim. Dyn.* **53**, 5349-5373.
- Cheng, J., W. Ma, **Z. Liu**, H. Lu and H. Wu, 2019: Varying sensitivity of East Asia summer monsoon circulation to temperature change since Last Glacial Maximum. *Geophys. Res. Lett.* **46**, 9103-9109.
- Shi, Y., Z. Jiang, **Z. Liu** and L. Li, 2019: A Lagrangian analysis of water vapor sources and pathways for precipitations in East China in different stages of the East Asian summer monsoon. *J. Clim.* **32**, 977-992.
- Jin, Y., **Z. Liu**, Z. Lu and C. He, 2019: Seasonal cycle of background in the tropical Pacific as a cause of ENSO spring persistence barrier. *Geophys. Res. Lett.*, <https://doi.org/10.1029/2019GL085205>.

2018

- Liu, Z.**, C. He and F. Lu, 2018: Local and remote forcing on atmospheric and oceanic heat transports: compensation vs collaboration. *J. Clim.* **31**, 6445-6460.
- Liu, Z.** and E. Di Lorenzo, 2018: Mechanism and predictability of Pacific Decadal Oscillation. *Current Climate Change Reports* **4**, 128-144.
- Lu, F. and **Z. Liu**, 2018: Assessing extratropical influence on the observed El Niño–Southern Oscillation events using regional coupled data assimilation. *J. Clim.* **31**, 8961-8969.
- Lu, Z., **Z. Liu**, J. Zhu and K. Cobb, 2018: A review of paleo ENSO. *Atmosphere* **9**, 130. doi:10.3390/atmos9040130.
- Lu, Z. and **Z. Liu**, 2018: Examining ENSO in the Holocene: implications and challenges. *National Science Review* **5**, 807-809.
- Clemens, S., A. Holbourn, Y. Kubota, K. Lee, **Z. Liu**, G. Chen, A. Nelson and B. Fox-Kemper, 2018: Precession-band variance missing from East Asian monsoon runoff. *Nat. Comm.* **9**, 3364.
- Zhu C., **Z. Liu** and S. Gu, 2018: Model bias for South Atlantic Antarctic Intermediate Water in CMIP5. *Clim. Dyn.* **50**, 3613-3624.

- Tabor, C., B. Otto-Bliesner, E. Brady, J. Nusbaumer, J. Zhu, M. Erb, T. Wong, D. Noone and **Z. Liu**, 2018: Interpreting precession driven $\delta^{18}\text{O}$ variability in the South Asian monsoon region. *J. Geophys. Res.-Atmos.* **123**, 5927-5946.
- Liu, Y.G., M. Zhang, **Z. Liu**, Y. Xia, Y. Huang, Y. Peng and J. Zhu, 2018: A possible role of dust in resolving the Holocene temperature conundrum. *Scientific Reports* **8**, 4434.
- Li, S., S. Zhang, **Z. Liu**, L. Lu, J. Zhu, X. Zhang, X. Wu, M. Zhao, G. Vecchi, R. Zhang and X. Lin, 2018: Estimating convective parameters in the GFDL CM2.1 model using ensemble data assimilation. *J. Adv. Modeling Earth Systems* **10**, 989-1010.
- Wu, S., **Z. Liu**, J. Cheng and C. Li, 2018: Response of North Pacific and North Atlantic decadal variability to weak global warming. *Adv. Climate Change Research* **9**, 95-101
- Jin Y., X. Rong and **Z. Liu**, 2018: Potential predictability and forecast skill in ensemble climate forecast: a skill-persistence rule. *Clim. Dyn.* **51**, 2725-2742.
- Thibodeau B., C. Not, J. Zhu, A. Schmittner, D. Noone, C. Tabor, J. Zhang and **Z. Liu**, 2018: Last century warming over Canadian Atlantic shelves linked to weaker Atlantic Meridional Overturning Circulation. *Geophys. Res. Lett.* **45**, 12376-12385.

2017

- Liu, W., S.-P Xie, **Z. Liu** and J. Zhu, 2017: Overlooked possibility of AMOC collapse in warming climate. *Science Advances* **3**, e1601666.
- Zhang, J., **Z. Liu**, E. C. Brady, A. Jahn, K. Lindsay, D. W. Oppo, P. U. Clark, S. A. Marcott, 2017: Asynchronous warming and $\delta^{18}\text{O}$ evolution of deep Atlantic water masses during the last deglaciation, *Proc. Natl Acad. Sci. USA* **114**, 11075-11080.
- Pausata F., Q. Zhang, F. Muschitiello, Z. Lu, L. Chafik, E. Niedermeyer, K. Cobb, J. Stager and **Z. Liu**, 2017: Greening of the Sahara suppressed ENSO variability in the mid- Holocene. *Nat. Comm.* **8**, 16020.
- Wang, P., B. Wang, H. Cheng, J. Fasullo, Z. Guo, T. Kiefer and **Z. Liu**, 2017: The global monsoon across time scales: mechanisms and outstanding issues. *Earth Sci. Rev.* **174**, 84-121.
- Zhu J., **Z. Liu**, B. Otto-Bliesner, E. Brady, D. Noone, J. Zhang, R. Tomas, A. Jahn, J. Nusbaumer and T. Wong, 2017: Reduced ENSO variability at the LGM revealed by an isotope-enabled Earth System Model. *Geophys. Res. Lett.* **44**, 6984-6992.
- Zhu, J., **Z. Liu**, E. Brady, B. Otto-Bliesner, S. Marcott, Jiaxu Zhang, Xianfeng Wang, Jesse Nusbaumer, Tony E. Wong, Alexandra Jahn, and David Noone, 2017: Investigating the direct meltwater effect in terrestrial oxygen isotope paleoclimate records using an isotope-enabled Earth system model. *Geophys. Res. Lett.* **44**, 12501-12510.
- Lu, F., **Z. Liu**, S. Zhang and R. Jacob, 2017: Assessing extratropical impact on tropical bias in climate model using regional coupled data assimilation. *Geophys. Res. Lett.* **44**, 3384-3392.
- Jiang, Z., S. Jiang, Y. Shi, **Z. Liu**, W. Li, and L. Li, 2017: Impact of moisture source variation on decadal-scale changes of precipitation in North China from 1951 to 2010, *J. Geophys. Res.-Atmos.* **122**, 600-613.
- Gu, S., **Z. Liu**, J. Zhang, J. Rempfer, F. Joos, E. Brady and D. Oppo, 2017: Coherent dynamic response of Antarctic Intermediate Water and Atlantic Meridional Overturning Circulation during deglaciation: reconciling contrasting neodymium isotope reconstructions from the tropical Atlantic. *Paleoceanography* **32**, 1036-1053.
- Gu, S. and **Z. Liu**, 2017: ^{231}Pa and ^{230}Th in the ocean model of Community Earth System Model (CESM1.3). *Geosci. Model Development* **10**, 4723-4742.
- Rong, X., **Z. Liu**, S. Duan, 2017: Seasonal dependence of the North Pacific and North Atlantic SST predictability and forecast skill. *Adv. Earth Sci.* **32**, 382-395
- Zhao Y., X. Deng, S. Zhang, **Z. Liu**, C. Liu, G. Vecchi, G. Han, and X. Wu, 2017: Impact of an observational window on coupled data assimilation: simulation with a simple climate model. *Nonlinear Processes in Geophysics* **24**, 681-694

- Liu, H., **Z. Liu** and F. Lu, 2017: A systematic comparison of particle filter and EnKF in assimilating time-averaged observations. *J. Geophys. Res.-Atmos.* **122**, 13155-13173.
- Thomas, E., S. Clemens, W. Prell, Y. Sun, G. Chen, **Z. Liu** and S. Lomis, 2017: Mid-latitude land surface temperature impacts the timing and structure of glacial cycles. *Geophys. Res. Lett.* **44**, 984-992.
- Liu, C., S. Zhang, S. Li and **Z. Liu**, 2017: Impact of the time scale of model sensitivity response on coupled model parameter estimation. *Adv. Atmos. Sci.* **34**, 1346–1357

2016

- Cheng, J., **Z. Liu**, S. Zhang, W. Liu, L. Dong, P. Liu and H. Li, 2016: Reduced interdecadal variability of Atlantic Meridional Overturning Circulation under global warming. *Proc. Natl Acad. Sci. USA* **113**, 3175-3178.
- Wen X., **Z. Liu**, S. Wang, J. Cheng and Jiang Zhu, 2016: Correlation and anti-correlation of the East Asian summer and winter monsoons during the last 21,000 years. *Nat. Comm.* **7**, 11999, DOI:10.1038/ncomms11999
- Guan, J. **Z. Liu**, X. Wen, E. Brady, D. Noone, J. Zhu and J. Han, 2016: Understanding temporal slope of temperature-water isotope relation in isoCAM3: the slope equation. *J. Geophys. Res.-Atmos.* **121**, 10342-10354.
- Liu, Z.**, H. Yang, C. He and Y. Zhao, 2016: A theory for Bjerknes compensation: the role of climate feedback. *J. Clim.* **29**, 191-208.
- Yang, H., Zhao, Y. and **Z. Liu**, 2016: Understanding Bjerknes compensation in atmosphere and ocean heat transports using a coupled box model. *J. Clim.* **29**, 2145-2160.
- Zhao Y., H. Yang and **Z. Liu**, 2016: Bjerknes Compensation for climate variability: assessment and time-scale dependency. *J. Clim.* **29**, 5501-5512.
- Feng J., J. Li, F-F Jin, N. Xing, Y. Guo and **Z. Liu**, 2016: Contrasting responses of the Hadley circulation to equatorially asymmetric and symmetric meridional sea surface temperature structures. *J. Clim.* **29**, 8949-8963.
- Wu, X. R., S. Q. Zhang, and **Z. Y. Liu**, 2016: Implementation of a one-dimensional enthalpy sea-ice model in a simple pycnocline prediction model for sea-ice data assimilation studies. *Adv. Atmos. Sci.* **33**, 193–207.
- Yan L., **Z. Liu**, G. Chen, J. E. Kutzbach and X. Liu, 2016: Mechanism of elevation-dependent warming over Tibetan Plateau in quadrupled CO2 experiments. *Clim. Change* **135**, 509-519.
- Li, S., S. Zhang, **Z. Liu**, X. Yang, A. Rosati, J-C Golaz and M. Zhao, 2016: The role of large-scale feedbacks in cumulus convection parameter estimation. *J. Clim.* **29**, 4099-4119.
- Fan L., S-I Shin, **Z. Liu** and Q. Liu, 2016: Two-sided impacts of Indo-Pacific warm pool SST on Australia precipitation changes. *Int. J. Clim.* **35**, 312-313
- Fan L., S-I Shin, **Z. Liu** and Q. Liu, 2016: Sensitivity of Asian summer monsoon precipitation to tropical sea surface temperature anomalies. *Clim. Dyn.* **47**, 2301-2514.
- Liu H., F. Lu, **Z. Liu**, Y. Liu Yun, and S. Zhang, 2016: Assimilating atmosphere reanalysis in coupled data assimilation. *J. Meteor. Res.* **30**, 572-583.
- Lu, F., **Z. Liu**, Y. Liu, S. Zhang and R. Jacob, 2016: Understanding extratropical atmospheric control of ENSO using a coupled data assimilation approach. *Clim. Dyn.* **48**, 3139-3160.
- Thomas, E., S. Clemens, Y. Sun, W. Prell, L. Gao, G. Chen and **Z. Liu**, 2016: Heterodynes dominate East Asian monsoon variability, reflecting interaction of multiple climate factors. *Earth Planet. Sci. Lett.* **455**, 196-206.
- Wen X., **Z. Liu**, Z. Chen, E. Brady, D. Noone, Q. Zhu and J. Guan, 2016: Modeling precipitation $\delta^{18}\text{O}$ variability in East Asia since the Last Glacial Maximum: temperature and amount effects across different time scales. *Clim. Past* **12**, 2077-2085.

2015

- Lu F., **Z. Liu**, S. Zhang and Y. Liu, 2015: Coupled data assimilation using Leading Averaged Coupled Covariance: I. A simple model study. *Mon. Wea. Rev.* **143**, 3823–3837.
- Lu F., **Z. Liu**, S. Zhang, Y. Liu and R. Jacob, 2015: Coupled data assimilation using Leading Averaged Coupled Covariance: II. A CGCM study. *Mon. Wea. Rev.* **143**, 4645–4659.
- Sun Y., J. Kutzbach, Z. An, S. Clemens, **Z. Liu**, W. Liu, X. Liu, Z. Shi, W. Zheng, L. Liang, Y. Yan and Y. Li, 2015: Astronomical and glacial forcing of East Asian summer monsoon variability. *Quat. Sci. Rev.* **115**, 132-142
- Lu, Z., **Z. Liu** and J. Zhu, 2015: Abrupt intensification of ENSO forced by deglacial ice sheet retreat in CCSM3. *Clim. Dyn.* **46**, 1877-1891.
- Jahn, A., K. Lyndsay, X. Giraud, N. Gruber, B. L. Otto-Bliesner, **Z. Liu**, and E. C. Brady, 2015: Carbon isotopes in the ocean model of the Community Earth System Model (CESM). *Geoscientific Model Development* **8**, 2419-2434.
- Han G., X. Wu, S. Zhang, **Z. Liu**, I. M. Navon, W. Li, 2015: A study of 4D-Var and EnKF coupling parameter-estimation with a simple coupled system. *Adv. in Meteorology*, doi:10.1155/2015/530764.
- Wen N., **Z. Liu** and Y. Liu, 2015: Direct impact of El Nino on East Asian summer precipitation in the observation. *Clim. Dyn.* **44**, 2979-2987.
- Zhu, L., Z. Jiang and **Z. Liu**, 2015: The impact of spring vegetation on the predictability of summer rainfall in the Yangtze region. *Acta Meteorologica Sinica* **73**, 895-909.
- Nace, T., G. Dwyer, C. Silva, C. Rigsby, D. Hollander, S. Burns, B. Otto-Bliesner, **Z. Liu**, J. Zhu and P. Baker, 2015: The role of North Brazil Current transport in the paleoclimate of Brazilian Nordeste margin and paleoceanography of the western tropical Atlantic during the late Quaternary. *Palaeogeography, Palaeoclimatology, Palaeoecology* **415**, 3-13.
- Liu, W., J. Lu, L. R. Leung, S. Xie, **Z. Liu** and J. Zhu, 2015: The de-correlation between westerly winds and westerly-wind-stress over the Southern Ocean during the Last Glacial Maximum. *Clim. Dyn.* **45**, 3157-3168.
- Zhang X., S. Zhang, **Z. Liu**, X. Wu and G. Han, 2015: Parameter optimization in an intermediate coupled climate model with biased physics. *J. Clim.* **28**, 1227-1247.
- Yu Y., M. Notaro, **Z. Liu**, F. Wang, F. Alkolibi, E. Fadda and F. Bakhryjy, 2015: Climatic controls on the interannual to decadal variability in Saudi Arabian dusk activity: towards the development of a seasonal dust prediction model. *J. Geophys. Res.-Atmos.* **120**, 1739-1758.
- Wu, X. R., G. Han, S. Zhang and **Z. Liu**, 2015: A study of the impact of parameter optimization on ENSO predictability with an intermediate coupled model. *Clim. Dyn.* **46**, 711-727.
- Yang, H., Y. Zhao, **Z. Liu**, Q. Li, F. He and Q. Zhang, 2015: Heat transport compensation in in atmosphere and ocean in the past 21,000 years. *Scientific Reports* **5**, 16661, doi:10.1038/srep16661
- Liu, W., **Z. Liu**, J. Cheng and H. Hu, 2015: On the stability of Atlantic Meridional Overturning Circulation during the last deglaciation. *Clim. Dyn.* **44**, 1257-1275.

2014

- Liu Z.**, Z. Lu, X. Wen, B. Otto-Bliesner, A. Timmermann, K. Cobb, 2014: The evolution and forcing mechanism of El Nino in the last 21,000 years. *Nature* **515**, 550-553
- Liu, Z.**, J. Zhu, Y. Rotherthal, X. Zhang, B. Otto-Bliesner, A. Timmermann, R. Smith, G. Lohmann, W. Zheng and O. Timm, 2014: The Holocene temperature conundrum. *Proc. Natl Acad. Sci. USA* **111**, E3501-3505.
- Otto-Bliesner, B., J. Russell, P. Clark, **Z. Liu**, J. Overpeck, B. Koneck, P. deMenocal, S. Nicholson, F. He and Z. Lu, 2014: Coherent changes of southeastern equatorial and northern African rainfall during the last deglaciation. *Science* **346**, 1223-1227.

- Liu, Z.**, X. Wen, E. Brady, B. Otto-Bliesner, G. Yu, H. Lu, H. Cheng, Y. Wang, W. Zheng, Y. Ding, L. Edwards, J. Cheng, W. Liu and H. Yang, 2014: Chinese cave records and East Asian Summer Monsoon. *Quat. Sci. Rev.* **83**, 115–128.
- Buizerti C., V. Gkinis, J. Severinghaus, F. He, B. Lecavalier, P. Kindler, M. Leuenberger, A. Carlson, B. Vinther, V. Masson-Delmotte, J. White, **Z. Liu**, B. Otto-Bliesner and E. Brook, 2014: Greenland temperature response to climate forcing during the Last Deglaciation. *Science* **345**, 1177-1180.
- Jomelli, V., V. Favier, R. Braucher, M. Vuille, P-H. Blard, M. Khodri, C. Colose, D. Brunstein, D. Bourlès, L. Leanni, V. Rinterknecht, D. Grancher, B. Francou, F. He, J.L. Ceballos, H. Francesca, **Z. Liu** and B. Otto-Bliesner, 2014: A major advance of tropical Andean glaciers during the Antarctic Cold Reversal. *Nature* **513**, 224-228.
- Shakun, J., P. Clark, F. He, **Z. Liu** and B. Otto-Bliesner, 2014: Regional and global forcing of glacier retreat during the last deglaciation. *Nat. Comm.* **6**, 8059.
- Chen G., **Z. Liu** and J. Kutzbach, 2014: Reexamining the barrier effect of Tibetan Plateau on the South Asian Monsoon. *Clim. Past* **10**, 1269-1275.
- Gibbons, F., D. Oppo, M. Mohtadi, Y. Rosenthal, K. Linsley, J. Cheng and **Z. Liu** and B. Linsley, 2014: Deglacial d¹⁸O of the tropical Pacific and Indian Oceans. *Earth Planet. Sci. Lett.* **387**, 240-251.
- Elizabeth T., S. Clemens, W. Prell, T. Herbert, Y. Huang, **Z. Liu**, J. Damsté, Y. Sun and X. Wen, 2014: Temperature and leaf wax d²H clarify the importance of seasonality in interpreting Asian hydroclimate proxies. *Geology* **42**, 1075-1078
- Liu, W. and **Z. Liu**, 2014: A note on the stability indicator of the Atlantic Meridional Overturning Circulation. *J. Clim.* **27**, 970-975.
- Liu, W., **Z. Liu** and E. Brady, 2014: Why is AMOC mono-stable in coupled general circulation models? *J. Clim.* **27**, 2427-2443.
- Liu W. and **Z. Liu**, 2014: Assessing the stability of the Atlantic Meridional Overturning Circulation of the past, present and future. *J. Meteor. Res.* **5**, 803-819.
- Zhu J., **Z. Liu**, J. Zhang, W. Liu and E. Brady, 2014: AMOC response to global warming: dependence on the background climate and response timescale. *Clim. Dyn.* **44**, 3449-3468.
- Zhu, J., **Z. Liu**, X. Zhang, I. Eisenman and W. Liu, 2014. Linear weakening of the AMOC in response to receding glacial ice sheets in CCSM3. *Geophys. Res. Lett.* **41**, 6252-6258
- Cheng J., **Z. Liu**, B. Otto-Bliesner, Feng He, J. Lynch-Stieglitz, 2014: Model-proxy comparison of overshoot phenomenon of Atlantic Thermohaline Circulation at Bolling Allerod. *Chinese Science Bulletin* **59**, 4510-4515.
- Jiang, Z., H. Yang, **Z. Liu**, Y. Zhu and N. Wen, 2014: Assessing the influence of regional SST modes on the winter temperature in China: the effect of tropical Pacific and Atlantic. *J. Clim.* **27**, 868–879
- Wu P., **Z. Liu**, J. Cheng and G. Cheng, 2014: Simulation of spatial-temporal asynchronization of East Asia summer's surface air temperature response to orbital forcing since the mid-Holocene. *Chinese J. Geophys.* (in Chinese) **57**, 1757-1768
- Wang, F., M. Notaro, **Z. Liu**, and G. Chen, 2014: Observed local and remote influences of vegetation on the atmosphere across North America using a model-validated statistical technique that first excludes oceanic forcings. *J. Clim.* **27**, 362-382.
- Wang, P., B. Wang, H. Cheng, J. Fasullo, Z. Guo, T. Kiefer and **Z. Liu**, 2014: The global monsoon across time scales: Is there coherent variability of regional monsoons? *Clim. Past* **10**, 2007-2052
- Watras, C., J. Read, S. Morgan and **Z. Liu**, 2014: Decadal oscillation of lakes and aquifers in the upper Great Lakes region of North America: Hydroclimatic implications. *Geophys. Res. Lett.* **41**, 456-462
- Nace, T. E., G. S. Dwyer, C. R. Silva, C. A. Gigsby, D. Hollander, S. J. Burns, B. Otto-Bliesner, **Z. Liu**, J. Zhu and P. A. Baker. 2014, The role of North Brazil Current transport in the

paleoclimate of the Brazilian Nordeste margin and paleoceanography of the western tropical Atlantic during the late Quaternary. *Palaeogeography, Palaeoclimatology, Palaeoecology* **415**, 3-13.

- Marson, J., I. Wainer, M. Mata and **Z. Liu**, 2014: The impacts of Meltwater Pulse-1A in the South Atlantic Ocean deep circulation since the Last Glacial Maximum. *Clim. Past* **10**, 1723-1734
- Kutzbach, J., G. Chen, **Z. Liu**, H. Cheng and L. Edwards, 2014: Potential role of winter rainfall in explaining increased moisture in the Mediterranean and Middle East during periods of maximum orbitally-forced insolation seasonality. *Clim. Dyn.* **42**, 1079-1095.
- Han, G., X. Zhang, S. Zhang, X. Wu and **Z. Liu**, 2014: Mitigation of coupled model biases induced by dynamical core misfitting through parameter optimization: simulation with a simple pycnocline prediction model. *Nonlinear Processes in Geophysics* **21**, 357-366
- Liu, Y., **Z. Liu**, S. Zhang, X. Rong, R. Jacob, S. Wu and F. Lu, 2014: Ensemble-based parameter estimation in a coupled GCM using the adaptive spatial average method. *J. Clim.* **27**, 4002-4014
- Liu, Y., **Z. Liu**, S. Zhang, R. Jacob, F. Lu, X. Rong and S. Wu, 2014: Ensemble-based parameter estimation in a coupled GCM. *J. Clim.* **27**, 1751-1762

2013

- Liu, W. and **Z. Liu**, 2013: A diagnostic indicator of the stability of the Atlantic meridional overturning circulation in CCSM3. *J. Clim.* **26**, 1926-1938
- Liu, W., **Z. Liu**, A. Hu, 2013: The stability of an evolving Atlantic meridional overturning circulation. *Geophys. Res. Lett.* **40**, 1562-1568.
- He, F., J. Shakun, P. Clark, A. Carlson, **Z. Liu**, B. Otto-Bliesner, J. Kutzbach, 2013: Northern Hemisphere forcing of Southern Hemisphere climate during the last deglaciation. *Nature* **494**, 81-85.
- Han G., X. Wu, S. Zhang, **Z. Liu**, W. Li, 2013: Error covariance estimation for coupled data assimilation using a Lorenz atmosphere and a simple pycnocline ocean model. *J. Clim.* **26**, 10218-10231.
- Liu, Z.**, Shu Wu, Shaoqing Zhang, Yun Liu and Xinyao Rong, 2013: Ensemble data assimilation in a simple coupled climate model: the role of ocean-atmosphere interaction. *Adv. Atmos. Sci.* **30**, 1235-1248.
- Wang F. Y., **Z. Liu** and M. Notaro, 2013: Extracting the dominant SST modes impacting North America climate: A comprehensive assessment in the observation. *J. Clim.* **26**, 5434-5452
- Ma, D., M. Notaro, **Z. Liu**, G. Chen and Y. Liu, 2013: Simulated impacts of afforestation in East China monsoon region as modulated by ocean variability. *Clim. Dyn.* **41**, 2439-2450.
- Wen, N., **Z. Liu**, and Q. Liu, 2013: Observational assessment of non-local heat flux feedback in the North Atlantic by GEFA. *J. Appl. Meteor. Climatol.* **52**, 645-653.
- Yang, H., Y. Wang and **Z. Liu**, 2013: A modelling study of the Bjerknes compensation in the meridional heat transport in a freshening ocean. *Tellus, A* **65**, 18480, <http://dx.doi.org/10.3402/tellusa.v65i0.18480>
- Song, Y. Y., Z. Wang and **Z. Liu**, 2013: Study of the main reasons causing the western Pacific SST anomaly. *Acta Scientiarum Naturalium Universitatis Pekinensis* (in Chinese) **5**, 806 -812.
- Fan, L., S.-I. Shin, Q. Liu, and **Z. Liu**, 2013: Relative importance of tropical SST anomalies in forcing East Asian summer monsoon circulation, *Geophys. Res. Lett.* **40**, 2471–2477.
- Lu, H., S. Yi, **Z. Liu**, J. Mason, D. Jiang, J. Cheng, T. Stevens, Z. Xu, E. Zhang, L. Jin, Z. Zhang, Z. Guo, Y. Wang and B. Otto-Bliesner, 2013: Variation of East Asian monsoon precipitation during the past 21 ka and potential CO₂ forcing. *Geology* **41**, 1023-1026
- Wu, P., Z. Liu, J. Cheng and Z. Sun, 2013: A simulation study on spatio-temporal asynchronism of East Asian Summer's precipitation variation since the mid-Holocene. *Quaternary Sciences* (in Chinese) **33**, 1001-7410

- Wen N. and **Z. Liu**, 2013: 海洋反馈研究中存在问题及其统计方法讨论, *大气科学学报* **2**, 1674–7097.
- Ma D., **Z. Liu**, S. Lv, M. Notaro, X. Rong, G. Cheng and F. Wang, 2013: Impacts of afforestation on climate over the East Asian monsoon region. *Chinese Science Bull.* **58**, 2073–2081.
- Yu Y., M. Notaro, **Z. Liu**, F. Alkolibi, E. Fadda and F. Bakhry, 2013: Assessing temporal and spatial variations in atmospheric dust over Saudi Arabia through satellite, radiometric, and station data. *J. Geophys. Res.-Atmos.* **118**, 13253–13264.
- Jiang, Z. H., W. Ren, **Z. Liu** and H. Yang, 2013: Analysis of water vapor transport characteristics during Meiyu over the Yangtze-Huaihe River valley using the Lagrangian method. *Acta Meteorologica Sinica* **71**, 295-304
- Back, L., K. Russ, **Z. Liu**, K. Inoue, J. Zhang and B. Otto-Bliesner. 2013: Global hydrological cycle response to rapid and slow global warming. *J. Clim.* **22**, 8781-8786

2012

- Liu, Z.**, A. Carlson, F. He, E. Brady, B. Otto-Bliesner, E. Brook, M. Wehrenberg, P. Clark, S. Wu, J. Cheng, J. Zhang, D. Noone and J. Zhu, 2012: The Younger Dryer cooling and Arctic climate response to atmospheric CO₂. *Proc. Natl Acad. Sci. USA* **109**, 11101-11104.
- Liu, Z.**, 2012: Dynamics of interdecadal climate variability: A historical perspective. *J. Clim.* **25**, 1963-1995
- Shakun J., P. Clark, Feng He, **Z. Liu**, Bette Otto-Bliesner, Shaun A. Marcott, Alan C. Mix, Andreas Schmittner and Edouard Bard: 2012: Global warming preceded by increasing CO₂ during the last deglaciation. *Nature* **484**, 49-54.
- Carlson, A., D. Ulman, F. Anslow, F. He., P. Clark, **Z. Liu** and B. Otto-Bliesner, 2012: Modeling the surface mass-balance response of the Laurentide Ice Sheet to Bolling Warming and its contribution to Meltwater Pulse 1A. *Earth Planet. Sci. Lett.* **315-316**, 24-29.
- Liu, Z.**, N. Wen and L. Fan, 2012: Assessing Atmospheric Response to Surface Forcing in the Observation: Part I: Cross-Validation of annual response using GEFA, LIM and FDT. *J. Clim.* **25**, 6796-6816
- Liu, Z.**, L. Fan, S.I. Shin and Q-Y. Liu, 2012: Assessing Atmospheric Response to Surface Forcing in the Observation: Part II: Cross-validation of seasonal response using GEFA and LIM. *J. Clim.* **25**, 6817-6834
- Clark, P., J. Shakun, P. Baker, P. Bartlein, S. Brewer, E. Brook, A. Carlson, H. Cheng, D. Kaufman, **Z. Liu**, T. Marchitto, A. Mix, C. Morrill, B. Otto-Bliesner, K. Pahnke, J. Russell, J. Adkins, J. Blois, J. Clark, S. Colman, W. Curry, B. Flower, F. He, T. Johnson, J. Lynch-Stieglitz, V. Markgraf, J. McManus, P. Moreno, J. Mitrovica, P. Moreno and J. Williams, 2012: Global climate evolution during the last deglaciation. *Proc. Natl Acad. Sci. USA* **109**, 1134-1142.
- Hu, A., G. Meehl, W. Han, A. Timmermann, B. Otto-Bliesner, **Z. Liu**, W. Washington, W. Large, A. Abe-Ouchi, M. Kimoto, K. Lambeck and B. Wu, 2012: Role of Bering Strait on the hysteresis of the ocean conveyor belt and glacial climate stability. *Proc. Natl Acad. Sci. USA* **109**, 6417-6422
- Veloz, S., J., Williams, F. He, B. Otto-Bliesner and **Z. Liu**, 2012: No-analog climates and shifting realized niches during the late Quaternary: implications for 21st-Century predictions by species distribution models. *Global Change Biology* **18**, 1698-1713.
- Williams, J., S. Veloz, S. Brewer, D. Nogues-Bravo, **Z. Liu**, B. Otto-Bliesner and F. He, 2012: The Ice Age ecologist: testing methods for reserve prioritization during the last global warming. *Global Ecology and Biogeography* **22**, 289-301.
- Murray D. S., A. E. Carlson, B. S. Singer, F. S. Anslow, Feng He, Marc Caffee, **Z. Liu**, B. L. Otto-Bliesner and S. A. Marcott, 2012. Northern Hemisphere forcing of the last deglaciation in southern Patagonia. *Geology* **40**, 631-634.

- Cheng J., P. Guo, F. Zhang, **Z. Liu**, L. Liu, and W. Qiu. 2012, Reconstruction of thermohaline circulation intensity anomaly over 20th century under two kinds of modeling diagnostic features. *Science in China Series D: Earth Sci.* **42**, 1778-1790.
- Li, S., X. Rong, Y. Liu, **Z. Liu**, K. Fraedrich, 2012: Dynamic analog initialization for ensemble forecasting. *Adv. Atmos. Sci.* **30**, 1406-1420.
- Chen G., M. Notaro, **Z. Liu** and Y. Liu, 2012: Simulated local and remote biophysical effects of afforestation over Southeast United States in boreal summer. *J. Clim.* **25**, 4511-4522
- Wu X., S. Zhang, **Z. Liu**, A. Rosati, T. Delworth and Yun Liu, 2012: Impact of the geographic-dependent parameter optimization on climate estimation and prediction: simulation with an intermediate coupled model. *Mon. Wea. Rev.* **140**, 3956-3971.
- Wu, X., S. Zhang, **Z. Liu**, A. Rosati and T. Delworth, 2012: A study of impact of the geographic dependence of observing system on parameter estimation with an intermediate coupled model. *Clim. Dyn.* **40**, 1789-1798.
- Blois, J., J. Williams, M. Fitzpatrick, S. Ferrier, S. Veloz, F. He, **Z. Liu**, G. Manion and B. Otto-Bliesner, 2012: Modeling the climatic drivers of vegetation compositional dissimilarity since the Last Glacial Maximum, *Ecography* **35**, 1-14
- Jiang Z., Y. Wu, **Z. Liu** and N. Wen, 2012: GEFA analysis of China winter temperature anomaly in 2009/2010, *Tropical Meteorology Acta* (in Chinese) **2**, 19-24.
- Wen N., **Z. Liu**, Z. Jiang, 2012: Review of GEFA analysis of ocean-atmosphere feedbacks. *Advances in Meteorological Science and Technology* (in Chinese) **2**, 19-24
- Liu, Y., J. Key, **Z. Liu**, X. Wang and S. Vavrus, 2012: A cloudier Arctic expected with diminishing sea ice. *Geophys. Res. Lett.* **39**, L05705, doi:10.1029/2012GL051251 (highlighted by Nat. Climate Change and AGU)

2011

- Liu, Z., 2011: Glacial cycles and Indian monsoon: A southern push. *Science* **333**,708-708
- Zhong, Y., **Z. Liu** and M. Notaro, 2011: A GEFA assessment of observed global ocean influence on US precipitation variability: attribution to regional SST variability modes. *J. Clim.* **24**, 693-707
- Cheng, J., **Liu, Z.**, He, F., and Otto-Bliesner, B. L. 2011: Impact of North Atlantic – GIN Sea exchange on deglaciation evolution of Atlantic Meridional Overturning Circulation, *Clim. Past Discuss.* **7**, 521-534.
- Frankignoul, C., N. Chouaib and **Z. Liu**, 2011: Estimating the observed atmospheric response to SST anomalies: Maximum Covariance Analysis, Generalized Equilibrium Feedback Assessment, and Maximum Response Estimation. *J. Clim.* **24**, 2523-2539.
- Marcott, S., P. Clark, L. Padman, G. Klinkhammer, S. Springer, **Z. Liu**, B. Otto-Bliesner, A. Carlson, A. Ungerer, J. Padman, F. He, J. Cheng and A. Schmittner, 2011: Ice-shelf collapse from subsurface warming as a trigger for Heinrich events. *Proc. Natl Acad. Sci. USA* **108**, 13415-13419.
- Fan, L., **Z. Liu**, and Q. Liu, 2011: Robust GEFA assessment of climate feedback to SST EOF modes. *Adv. Atmos. Sci.* **28**, 907-912.
- Wu, S., **Z. Liu**, R. Zhang and T. Delworth, 2011: On the observed relationship between the Pacific decadal oscillation and the Atlantic Multi-decadal oscillation. *J. Oceanogr.* **67**, 27-35.
- Cheng, J., **Z. Liu**, F. He, B. Otto-Bliesner and E. Brady, 2011: Simulated two-stage recovery of the Atlantic overturning circulation during last deglaciation. *AGU Monograph: Abrupt Climate Change: Mechanisms, Patterns, and Impacts, Geophysical Monograph Series* **193**, 75-92.
- Zhang, S.Q., **Z. Liu**, A. Rosati and T. Delworth, 2011: A study of enhance parameter correction with coupled data assimilation for climate estimation and prediction using a simple coupled model. *Tellus A.* **63**, 10963, DOI: 10.3402/tellusa.v63i0.10963

- Shi, Z., X. Liu, Y. Sun, Z. An, **Z. Liu**, and J. Kutzbach, 2011: Distinct responses of East Asian summer and winter monsoons to astronomical forcing, *Clim. Past* **7**, 1363-1370.
- Notaro M., G. Chen and **Z. Liu**, 2011: Vegetation feedbacks to climate in the global monsoon regions. *J. Clim.* **24**, 5740-5756
- Chen G.S., J.E. Kutzbach, R. Gallimore and Z. Liu: 2011: Calendar effect on phase study in paleoclimate transient simulation with orbital forcing. *Clim. Dyn.* **37**, 1949-1960

2010

- Liu, Z.**, 2010: Bimodality in a mono-stable climate-ecosystem model: the role of climate variability and soil moisture memory. *J. Clim.* **23**, 1447-1455
- Chen, G., **Z. Liu**, J. Kutzbach, S. Clemens, W. Prell and X. Liu, 2010: Modeling the time-dependent response of the Asian summer monsoon to obliquity forcing in a coupled GCM: a PHASEMAP sensitivity experiment. *Clim. Dyn.* **36**, 695-710.
- Wen N., **Z. Liu**, Q. Liu and C. Frankignoul, 2010: Observed atmospheric response to global SST variability modes: an unified assessment using GEFA. *J. Clim.* **23**, 1739-1759.
- Liu, Z.**, M. Notaro and R. Gallimore, 2010: Indirect vegetation-soil moisture feedback: with application to Holocene North Africa climate. *Global Change Biology* **16**, 1733-1743.
- Yang, J. L., Q. Y. Liu and **Z. Liu**, 2010: Linking Asian monsoon to Indian Ocean SST in the observation: possible roles of Indian Ocean Basin Mode and Dipole Mode. *J. Clim.* **23**, 5889-5902.
- Zhu X.H., K. Fraedrick, **Z. Liu** and R. Blender, 2010: A demonstration of long term memory and climate predictability. *J. Clim.* **23**, 5021-5029
- Cheng J., **Z. Liu**, F. He, B. Otto-Bliesner, P.W. Kuo and Z. X. Chen, 2010: Modeling evidence of North Atlantic climatic impact on East Asia. *Chinese Science Bull.* **55**, 3215-3221
- Notaro, M., **Z. Liu**, R. Gallimore, J. Williams, D. Gutzler and S. Collins, 2010: The complex seasonal cycle of ecohydrology in the Southwest United States. *J. Geophys. Res.-Biogeosciences* **115**, G04034, doi:10.1029/2010JG001382
- Liu, W., F. Bretherton, **Z. Liu**, L. Smith, H. Lu and C. Rutland, 2010: Breaking of progressive internal waves: convective instability and shear instability. *J. Phys. Oceanogr.* **40**, 2243-2263.

2009

- Liu, Z.**, B. Otto-Bliesner, F. He, E. Brady, P. Clark, J. Lynch-Steiglitz, A. Carlson, W. Curry, E. Brook, R. Jacob, D. Erickson, J. Kutzbach and J. Cheng, 2009: Transient simulation of deglacial climate evolution with a new mechanism for Bolling-Allerod warming. *Science* **325**, 310-314.
- Zhu X. J. and **Z. Liu**, 2009: Tropical SST response to global warming in the 20th century. *J. Clim.* **22**, 1305-1312
- Mason, J., H. Lu, Y. Zhou, X. Miao, J.B. Swinehart, **Z. Liu**, R. J. Goble and S. Yi, 2009: Dune mobility and aridity at the desert margin of northern China at a time of peak monsoon strength. *Geology* **37**, 947-950.
- Zhong Y. F. and **Z. Liu**, 2009: On the mechanism of Pacific multidecadal climate variability in CCSM3: the role of subpolar North Pacific Ocean. *J. Phys. Oceanogr.* **39**, 2052-2076
- Yang, J. L., Q. Y. Liu and **Z. Liu**, L. Wu and F. Huang, 2009: Basin mode of Indian Ocean sea surface temperature and northern hemisphere circumglobal teleconnection. *Geophys. Res. Lett.* **36**, L19705, doi:10.1029/2009GL039559.

2008

- Liu, Z.**, N. Wen and Y. Liu, 2008: On the assessment of non-local climate feedback: I: the generalized Equilibrium Feedback Analysis. *J. Clim.* **21**, 134-148.

- Liu Z.** and N. Wen, 2008: On the assessment of non-local climate feedback: II: EFA-SVD analysis and optimal feedback. *J. Clim.* **21**, 5404-5418.
- Zhong Y.**, **Z. Liu** and R. Jacob, 2008: The origin of Pacific Decadal Variability in the NCAR-CCSM3. *J. Clim.* **21**, 114-133.
- Kutzbach, J., X. Liu, **Z. Liu** and G. Chen, 2008: Simulation of the evolutionary response of global summer monsoons to orbital forcing over the past 280,000 years. *Clim. Dyn.* **30**, 6567-6579.
- Notaro, M.**, Y. Wang, **Z. Liu**, R. Gallimore and S. Levis, 2008: Combined statistical and dynamical assessment of the simulated negative vegetation feedback on North African annual precipitation during the mid-Holocene. *Global Change Biology* **14**, 347-368.
- Pan A., Q. Liu and **Z. Liu**, 2008: Formation mechanism of the “stability Gap” and the North Pacific Central mode water. *Chinese Journal of Geophysics* **47**, 461-470.
- Bayler E.** and **Z. Liu**, 2008: Wind-forced dynamics of the seasonal southern South China Sea gyre. *J. Geophys. Res.-Ocn*, **113** C07014, doi:10.1029/2007JC00519
- Zhong Y. F.** and **Z. Liu**, 2008: A joint statistical and dynamical assessment of atmospheric response to North Pacific oceanic variability in CCSM3. *J. Clim.* **21**, 6044-6051
- Lee D.**, **Z. Liu** and Y. Liu, 2008: Beyond thermal interaction between ocean and atmosphere: on the extratropical climate variability due to wind-induced SST. *J. Clim.* **21**, 2001-2018
- White, W. B. and **Z. Liu**, 2008: Nonlinear alignment of El Nino to the 11-yr solar cycle. *Geophys. Res. Lett.* **35**, L19606, doi:10.1029/2008GL034831
- Clemens, S. C., W. Prell, **Z. Liu** and G. Chen, 2008: Southern Hemisphere forcing of Pliocene d¹⁸O indicated by evolution of Indo-Asian monsoons. *Paleoceanography* **23**, PA4210, doi:10.1029/2008PA001638
- Wyrwoll K-H., **Z. Liu**, G. Chen, J. Kutzbach and X. Liu, 2008: Sensitivity of Australia summer monsoon to tilt and precession forcing. *Quat. Sci. Rev.* **26**, 3043-3057.
- Nie, J.S., J. King, **Z. Liu**, S. Clemens, W. Prell and X. M. Fang, 2008: Surface water freshening: A cause of North Pacific stratification from 2.75 Ma onward? *Global and Planetary Change* **64**, 49-52
- Notaro M.** and **Z. Liu**, 2008: Joint statistical and dynamical assessment of vegetation feedbacks on climate over boreal forest. *Clim. Dyn.* **31**, 691-712.

2007

- Liu, Z.**, Y. Liu, L. Wu and R. Jacob, 2007: Seasonal and long-term atmospheric responses to reemerging North Pacific ocean variability: a combined dynamical and statistical assessment. *J. Clim.* **20**, 955-980.
- Liu, Z.**, and M. Alexander, 2007: Atmospheric bridge, oceanic tunnel, and global climatic teleconnections. *Rev. Geophys.* **45**, RG2005, doi:10.1029/2005RG000172.
- Liu, Z.**, Y. Wang, R. Gallimore, F. Gasse, T. Johnson, P. deMenocal, J. Adkins, M. Notaro, I.C. Prentice, J. Kutzbach, R. Jacob, P. Behling, L. Wang and E. Ong, 2007: Simulating the transient evolution and abrupt change of Northern Africa atmosphere-ocean-terrestrial ecosystem in the Holocene. *Quat. Sci. Rev.* **26**, 1818-1837.
- Abram N., M. Gagan, **Z. Liu**, W. Hantoro, M. McCulloch and B. Suwargadi, 2007: Seasonal characteristics of the Indian Ocean Dipole during the Holocene epoch. *Nature* **445**, 299-302
- Wu L.**, **Z. Liu**, C. Li and Y. Sun, 2007: Extratropical control of recent tropical Pacific decadal climate variability: a relay teleconnection. *Clim. Dyn.* **28**, 99-112.
- Wu, L.**, F. He and **Z. Liu**, 2007: Atmospheric teleconnections of tropical Atlantic variability: interhemispheric, tropical-extratropical and cross-basin interactions. *J. Clim.* **20**, 856-870
- Notaro, M.**, S. J. Vavrus and **Z. Liu**, 2007: Global vegetation and climate change due to future increases in CO₂ as projected by a fully coupled model with dynamic vegetation. *J. Clim.* **20**, 70-90.
- Notaro M.** and **Z. Liu**, 2007: Potential impact of Eurasian boreal forest on North Pacific climate variability. *J. Clim.* **20**, 981-992

- Zhu, X. J., J. L. Sun, Q. Liu, **Z. Liu** and J. Martin, 2007: A synoptic analysis of the interannual variability of winter cyclone activity in the Aleutian Low region *J. Clim.* **20**, 1523-1538.
- Wang, Y., M. Notaro, **Z. Liu**, R. Gallimore, S. Levis, and J.E. Kutzbach, 2007: Detecting vegetation-precipitation feedbacks in mid-Holocene North Africa from two climate models. *Clim. Past* **3**, 961-975.
- Yang, J, Q. Liu, S., Xie, **Z. Liu** and L. Wu, 2007: Impact of the Indian Ocean SST basin mode on the Asian summer monsoon. *Geophys. Res. Lett.* **34**, L02708, doi:10.1029/2006GL028571
- Liu, X., **Z. Liu**, S. Clemens, W. Prell and J. Kutzbach, 2007: A coupled model study of glacial Asian Monsoon variability and Indian Ocean Dipole. *J. Meteor. Soc. Japan* **85**, 1-10.
- White, W. B. and **Z. Liu**, 2007: Resonant excitation of the quasi-decadal oscillation by the 11-year signal in the Sun's irradiance. *J. Geophys. Res.-Ocn* **113**, C01002, doi:10.1029/2006JC004057.

2006

- Liu, Z.**, M. Notaro, J. Kutzbach and N. Liu, 2006: Assessing global vegetation-climate feedbacks from the observation. *J. Clim.* **19**, 787-814.
- Notaro, M. **Z. Liu** and J. Williams, 2006: An observational assessment of climate-vegetation feedback in the U.S. *J. Clim.* **19**, 763-786.
- Vavrus S., M. Notaro and **Z. Liu**, 2006: A mechanism for abrupt climate change associated with tropical Pacific SSTs. *J. Clim.* **19**, 242-256.
- Liu, Q., N. Wen and **Z. Liu**, 2006: An observational study of the impact of the North Pacific SST on the atmosphere. *Geophys. Res. Lett.*, **33**, L18611, doi:10.1029/2006GL026082
- Liu Q., **Z. Liu** and A. Pan, 2006, Conceptual model about the interaction between El Niño/Southern Oscillation and Quasi-Biennial Oscillation in far west equatorial Pacific. *Science in China, Series D-Earth Sciences* **49**, 889-896
- Liu Y., Z. An, H. Ma, Q., Cai, **Z. Liu**, J. Kutzbach, J. Shi, H. Song, J. Sun, Y. Liang, Q. Li, Y. Yang and L. Wang, 2006: Precipitation variation in the northeastern Tibetan Plateau recorded by the tree rings since 850 AD and its relevance to the Northern Hemisphere temperature. *Science in China, Series D. Earth Sciences* **49**, 408-420
- Liu, Z.**, 2006: Glacial thermohaline circulation and climate: forcing from the North or South? *Adv. Atmos. Sci.* **22**, 199-206
- Liu, X., J. Kutzbach, **Z. Liu**, S. Clemens and W. Prell, 2006: Hemispheric climate forcing and remote response of Asian monsoon. *J. Clim.* **19**, 695-6208
- Liu, Z.**, Y. Wang, R. Gallimore, M. Notaro, C. I. Prentice, 2006: On the mechanism of abrupt change of Northern Africa environment in the Holocene: climate variability vs. vegetation feedback. *Geophys. Res. Lett.* **33**, L22709, doi:10.1.29/2006GL028062

2005

- Liu, Z.**, S. Shin, R. Webb, W. Lewis and B. Otto-Bliesner, 2005: Atmospheric CO₂ forcing on glacial thermohaline and climate. *Geophys. Res. Lett.* **32**, L02706, doi:10.1029/2004GL021929
- Liu, Z.**, S. Vavrus. F. He, N. Wen and Y. Zhong, 2005: Rethinking tropical ocean response to global warming: the enhanced equatorial warming. *J. Clim.* **18**, 4684-4700
- Yang H., Q. Zhang, Y. Zhong, S. Vavrus, **Z. Liu**, 2005: How does extratropical warming affects ENSO? *Geophys. Res. Lett.* **32**, L01702, doi:10.1029/2004GL021624
- Zhao, Y., P. Braconnot, O. Marti, S.P. Harrison, C. Hewitt, A. Kitoh, **Z. Liu**, U. Mikolajewicz, B. Otto-Bliesner and S. L. Weber, 2005: A multi-model analysis of ocean feedback on the African and Indian monsoon during the mid-Holocene. *Clim. Dyn.* **25**, 777-800
- Notaro, M., **Z. Liu**, R. Gallimore, S. Vavrus, J. Kutzbach, C. Prentice and R. Jacob, 2005: Simulated and observed pre-industrial to modern vegetation and climate changes. *J. Clim.* **18**, 3650-3671

- An S-I, A. Timmermann, L. Bejarano, F.-F. Jin, **Z. Liu** and S. Tudhope, 2005: Modeling evidence for enhanced ENSO variability during the Last Glacial Maximum. *Paleoceanography* **19**, doi:10.1029/2004PA001020
- Pan A., Q. Liu and **Z. Liu**, 2005: Periodic forcing and ENSO suppression in the Cane-Zebiak model. *J. Oceanography* **61**, 109-113
- Liu, Y, Q. Cai, J. Shi, M. Hughes, J. E. Kutzbach, **Z. Liu**, F. Ni and Z. An, 2005: Seasonal precipitation in the south-central Hellen Mountain region, China, reconstructed from tree-ring width for the past 224 years. *Can. J. For. Res.* **35**, 2403-2412
- Yang H. and **Z. Liu**, 2005: Tropical-extratropical climate interaction as revealed in idealized coupled climate model experiments. *Clim. Dyn.*, **24**, 863-879.
- Wen N., **Z. Liu**, C. Frankignoul, Q. Liu, 2005: Observations of SST, heat flux and ocean-atmosphere interaction over the North Atlantic. *Geophys. Res. Lett.* **32**, L24619, doi:10.1029/2005GL024871
- Wu L. and **Z. Liu**, 2005: North Atlantic decadal variability: air-sea coupling, oceanic memory, and potential northern hemisphere resonance. *J. Clim.* **18**, 331-349
- Wu L., **Z. Liu**, Y. Liu, Q. Liu, and X. Liu, 2005: Potential global climatic impacts of the North Pacific Ocean. *Geophys. Res. Lett.* **32**, L24710, doi:10.1029/2005GL024812.
- Wu L., D. Lee and **Z. Liu**, 2005: The 1976/77 North Pacific climate regime shift: the role of subtropical ocean adjustment and coupled ocean-atmosphere feedbacks. *J. Clim.* **18**, 5125-5140.
- Wu L., F. He and **Z. Liu**, 2005: Coupled ocean-atmosphere response to tropical North Atlantic SST variability: Tropical Atlantic Dipole and ENSO. *Geophys. Res. Lett.* **32**, L21712, 10.1029/2005GL024222.

2004

- Liu, Z.**, Q. Zhang and L. Wu, 2004: The remote impact on tropical Atlantic climate variability: the dynamic assessment and statistical assessment. *J. Clim.* **17**, 1529-1549
- Liu, Z.** and L. Wu, 2004: Atmospheric response to North Pacific SST: The role of ocean-atmosphere coupling. *J. Clim.* **17**, 1859-1882
- Yang H., **Z. Liu** and H. Wang, 2004: Influence of extratropical thermal and wind forcing on equatorial thermocline in an ocean GCM. *J. Phys. Oceanogr.* **34**, 174-187
- Yang H., **Z. Liu** and Q. Zhang, 2004: Tropical ocean decadal variability and the resonance of planetary wave basin modes: II: numerical study. *J. Clim.* **17**, 1711-1721
- Wu L., Q. Zhang, and **Z. Liu**, 2004: Understanding the tropical Atlantic variability using coupled modeling surgery. In *Earth Climate: The Ocean-Atmosphere Interaction*, C. Wang, S.-P. Xie and J.A. Carton (eds.), *AGU Geophysical Monograph* **147**, 157-170.
- Liu, Z.**, S. Harrison, J. Kutzbach, B. Otto-Bliesner: 2004: Global monsoons in the mid-Holocene and oceanic feedback. *Clim. Dyn.* **22**, 157-182.
- Liu, Z.**, W. Lewis and A. Ganopolski, 2004: A coordinated acceleration scheme for the simulation of long term climate evolution. *Clim. Dyn.* **22**, 771-781

2003

- Liu, Z.** and H. Yang, 2003: Extratropical control on tropical climate: atmospheric bridge and oceanic tunnel. *Geophys. Res. Lett.* **30**, 10.1029/2002GL016492
- Liu, Z.**, 2003: Tropical ocean decadal variability and the resonance of planetary wave basin modes: I: theory. *J. Clim.* **16**, 1539-1550
- Yang H. and **Z. Liu**, 2003: On basin modes in a tropical-extratropical ocean. *J. Phys. Oceanogr.* **33**, 2751-2763
- Wu L., **Z. Liu**, R. Gallimore, R. Jacob, D. Lee, and Y. Zhong, 2003: A coupled modeling study of Pacific decadal variability: the Tropical Mode and the North Pacific Mode. *J. Clim.* **16**, 1101-1120

- Wu, L. and **Z. Liu**, 2003: Decadal variability in the North Pacific: the Eastern North Pacific Mode. *J. Clim.* **16**, 3111-3131
- Wu, L., and **Z. Liu**, 2003: On the dynamics of North Atlantic decadal variability. *Clivar Exchange* **28**.
- Wang, D. , J. Wang, L. Wu, **Z. Liu**. 2003. Relative importance of wind and buoyancy forcing for interdecadal regime shifts in the Pacific. *Science in China* **46**, 417-427
- Wang, D. J. Wang, L. Wu, and **Z. Liu**, 2003: Regime shifts in the North Pacific simulated by a COADS-driven isopycnal model. *Adv. Atmos. Sci.* **20**, 743-754.
- Harrison, S., J. Kutzbach, **Z. Liu**, P. Bartlein, B. Otto-Bliesner, D. Muhs, I. Prentice and R. Thompson, 2003: Mid-Holocene climates of the Americas: a dynamical response to changed seasonality. *Clim. Dyn.* **20**, 663-688
- Shin S., **Z. Liu**, B. Otto-Bliesner, E. Brady, J. Kutzbach, S. Harrison, 2003: A NCAR CCSM simulation of the climate at the Last Glacial Maximum. *Clim. Dyn.* **20**, 127-151
- Miller, A., M. Alexander, G. Boer, F. Chai, K. Denman, D. Erickson, R. Frouin, A. Gabric, E. Laws, M. Lewis, **Z. Liu**, R. Murtugudde, S. Nakamoto, D. Nelson, J. Norris, J. Ohlmann, R. Perry, N. Schneider, K. Shell and A. Timmermann, 2003: Potential feedbacks between Pacific ocean ecosystems and interdecadal climate variations. *Bull. Amer. Meteor. Soc.* **84**, 617-633
- Liu, X., J. Kutzbach, **Z. Liu**, Z. An, Li L., 2003: The amplification of Tibetan Plateau on the effect of orbital forcing on the East Asian monsoon. *Geophys. Res. Lett.* **30**, 1839, doi:10.1029/2003GL017510.
- Otto-Bliesner, B., E. Brady, S. Shin, **Z. Liu**, C. Shields, 2003: Modeling El Nino and its tropical teleconnections during the glacial-interglacial cycle. *Geophys. Res. Lett.* **30**, 2198, doi:10.1029/2003GL08553
- Loubere P., M. Richaud, **Z. Liu** and F. Mekik, 2003: Oceanic conditions in the eastern equatorial Pacific during the onset of ENSO in the Holocene. *Quat. Res.* **60**, 142-148
- Liu, Z.**, B. Otto-Bliesner, J. Kutzbach, L. Li, C. Shields, 2003: Coupled climate simulations of the evolution of global monsoons in the Holocene. *J. Clim.* **16**, 2472-2490
- Liu, Z.**, E. Brady and J. Lynch-Steiglitz, 2003: Global ocean response to orbital forcing in the Holocene. *Paleoceanography* **18**, 1041, doi:10.1029/2002PA000819.

2002

- Liu, Z.**, 2002: How long is the memory of tropical ocean dynamics. *J. Clim.* **15**, 3518-3522
- Liu, Z.**, 2002: A simple model study of the forced response of ENSO to an external periodic forcing. *J. Clim.* **15**, 1088-1098.
- Liu, Z.**, W. Wu, R. Gallimore and R. Jacob, 2002: Search for the origins of Pacific decadal climate variability. *Geophys. Res. Lett.* **29** , 10.1029/2001GL013735
- Inui T. and **Z. Liu**, 2002: An interpretation of Pacific thermocline variability. The effect of wind forcing on subduction. *J. Phys. Oceanogr.* **32**, 1094-1105.
- Vavrus, S., and **Z. Liu**, 2002: Understanding the response of the tropical atmosphere-ocean system to increased CO₂ using Equilibrium Asynchronous Coupling. *Clim. Dyn.* **19**, 355-369.
- Huang, B. and **Z. Liu**, 2002: An OGCM Simulation of seasonal and interannual variability in the surface layer Pacific of the equatorial band. *Adv. Atmos. Sci.* **19**, 219-235.
- Wu L. and **Z. Liu**, 2002: Dynamic control of Pacific oceanic variability on the western boundary and marginal seas. *Geophys. Astrophys. Fluid Dyn.* **96**, 201-222.
- Yang H., Q. Liu, **Z. Liu**, D. Wang and X. Liu, 2002: A GCM study of the dynamics of the upper ocean circulation of the South China Sea. *J. Geophys. Res.-Ocn* **107**, 10.1029/2001JC001084, 22-1-14
- Liu, Q.Y., Y. Jia, H. Yang and **Z. Liu**, 2002: Seasonal variation mechanism of sea surface height in the north of the SCS. *Acta Oceanologica Sinica* **24**, 134-141

- Shin S., Z. Liu, B. Otto-Bliesner, E. Brady, J. Kutzbach, 2002: Southern Ocean sea-ice control of the glacial North Atlantic thermohaline circulation. *Geophys. Res. Lett.* **30**, DOI:10.1029/2002GL015513
- Wu L. and Z. Liu, 2002: Is tropical Atlantic variability driven by the North Atlantic Oscillation? *Geophys. Res. Lett.* **29**, 10.1029/2002GL014939
- Wu, L., Q. Zhang and Z. Liu, 2002: Searching for the role of ENSO in the tropical Atlantic variability. *Clivar Exchanges* **25**.
- Liu, Z., S. Shin, B. Otto-Bliesner, J. Kutzbach and E. Brady, 2002: Tropical Cooling at the Last Glacial Maximum and Extratropical Ocean Ventilation. *Geophys. Res. Lett.* **29**, 10.1029/2001GL013938

2001

- Liu, Z., H. Yang and Q. Liu, 2001: Regional dynamics of seasonal variability of sea surface height in the South China Sea. *J. Phys. Oceanogr.* **31**, 272-284
- Yang, H., Q. Liu and Z. Liu, 2001: Sverdrup dynamics in the South China Sea. *Progress in Natural Science* **10**, 1035-1039
- Liu, Q, H. Yang and Z. Liu, 2000: Seasonal features of Sverdrup circulation in the South China Sea. *Progress in Natural Science* **11**, 202-206
- Delire C., P. Behling, M. T. Coe, J.A. Foley, R. Jacob, J. Kutzbach, Z. Liu and S. Vavrus, 2001: Simulated response of the atmosphere-ocean system to deforestation in the Indonesian Archipelago. *Geophys. Res. Lett.* **28**, 2081-2084
- Huang, B. and Z. Liu, 2001: On the upper ocean trend of the Pacific Ocean in the last 40 years. *J. Clim.* **14**, 3738-3750.
- Zhou W., M. John, Z. An, P.D. Deckker, Z. Liu, X. Liu, X. Lu, A. J. T. Jull, D. Donahue, 2001: Terrestrial evidence for a spatial structure of tropical-polar interconnections during the Younger Dryas Episode. *Earth Planet. Sci. Lett.* **191**, 231-239
- Wu, L., Z. Liu and R. Gallimore, 2001: Pacific interdecadal variability in a coupled model. *Dynamics of Atmospheric and Oceanic Circulations and Climate*, ed. B. Wang, China Meteorological Press, 486-507
- Liu Q.Y., Haijun Yang Shaoxia Wang, Z. Liu, 2001: Dynamic features of long Rossby wave in the North Pacific subtropical countercurrent. *Chinese Journal of Geophysics* **44**, 27-37
- Stephens M., Z. Liu and H. Yang, 2001: On the evolution of subduction planetary waves with application to Pacific decadal thermocline variability. *J. Phys. Oceanogr.* **31**, 1733-1746
- Stephens M. Y. and Z. Liu, 2001: The response of the upper ocean to surface buoyancy forcing: a characteristic solution to wave propagation. *Contemporary Mathematics* **275**, 117-127

2000

- Liu, Z., J. Kutzbach and L. Wu, 2000: Modeling climatic shift of El Nino variability in the Holocene. *Geophys. Res. Lett.*, **27** 2265-2268.
- Liu, Z., S. Shin, P. Behling, W. Prell, M. Trend, S. Harrison and J. Kutzbach, 2000: Dynamic and observational constraints of sea surface temperature in the tropical Pacific at the Last Glacial Maximum. *Geophys. Res. Lett.* **27**, 105-108.
- Liu Z. and B. Huang, 2000: Causes of the warming trend of the tropical Pacific Ocean. *Geophys. Res. Lett.* **27**, 1935-1938.
- Wu, L., Z. Liu, and H. Hurlburt, 2000: Kelvin wave and Rossby wave interaction in the extratropical-tropical Pacific. *Geophys. Res. Lett.* **27**, 1259-1262.
- Liu Z. and L. Wu, 2000: Tropical Atlantic Oscillation in a coupled GCM. *Atmos. Sci. Lett.* **1**, 26-36
- Wang, D. X. and Z. Liu, 2000: The pathway of interdecadal variability in the Pacific Ocean. *Chinese Science Bulletin* **45**, 1555-1561

- Vavrus, S., R. Gallimore and Z. Liu, 2000: A mixed-flux equilibrium asynchronous coupling scheme for accelerating convergence in ocean-atmosphere models. *Clim. Dyn.* **16**, 821-831
- Huang, B. and Z. Liu, 2000: Temperature trends in the upper tropical Indian Ocean: 1955-1993. *Dynamics of Atmospheric and Oceanic Circulations and Climate, Memorial Volume for Prof. Zhu Baozhen*, China Ocean Meteorological, 413-433
- Shin S. and Z. Liu, 2000: Response of equatorial thermocline to extratropical buoyancy forcing. *J. Phys. Oceanogr.* **30**, 2883-2905

1999

- Liu, Z., 1999: Planetary wave modes in thermocline circulation: Non-Doppler-shift mode, advective mode and Green mode. *Quat. J. Royal Meteor. Soc.* **125**, 1315-1339
- Liu, Z., 1999: Forced planetary wave response in a thermocline gyre. *J. Phys. Oceanogr.* **29**, 1036-1055
- Liu, Z. and S. Shin, 1999: On thermocline ventilation of active and passive tracers. *Geophys. Res. Lett.* **26**, 357-360.
- Liu, Z., L. Wu and E. Bayler, 1999: Rossby wave -- coastal Kelvin wave interaction in the extratropics. I: low frequency adjustment in a closed basin. *J. Phys. Oceanogr.* **29**, 2383-2404
- Liu, Z., L. Wu and H. Hurlburt, 1999: Rossby wave- Coastal Kelvin wave interaction in the extratropics: II: formation of island circulation. *J. Phys. Oceanogr.* **29**, 2405-2418
- Huang, B. and Z. Liu, 1999: Pacific subtropical-tropical thermocline water exchange in the National Centers for Environmental Prediction ocean model. *J. Geophys. Res.-Ocn.* **104**, 11,065-11,076
- Wu, L., Z. Liu and H. Hurlbert, 1999: The effect of continental slope on buoyancy-driven circulation. *J. Phys. Oceanogr.* **29**, 1881-1891
- Wu, L., Z. Liu and H. Hurlburt, 1999: The effect of north-south gyre width on the inertial recirculation. *Geophys. & Astrophys. Fluid Dyn.* **91**, 45-63
- Liu, Z., R. Gallimore, J. Kutzbach, W. Xu, Y. Golubev, P. Behling and R. Siegle, 1999: Modeling long term climate change with the Equilibrium Asynchronous Coupling scheme. *Clim. Dyn.* **15**, 325-340
- Zhang R. H and Z. Liu, 1999: Decadal thermocline variability in the North Pacific: two pathways around the subtropical gyre. *J. Clim.* **12**, 3273-3296
- Liu, Z., R. Jacobs, J. Kutzbach, S. Harrison and J. Anderson, 1999: Asian monsoon impact on El Nino in the early Holocene. *PAGES Newsletter* **7** (2), 16-17

1998

- Liu, Z., 1998: On the role of ocean in the transient response of tropical climatology to global warming. *J. Clim.* **11**, 864-875.
- Liu, Z. and B. Huang, 1998: Why is there a tritium maximum in the central equatorial Pacific thermocline? *J. Phys. Oceanogr.* **28**, 1527-1533.
- Liu, Z. and R. Zhang, 1998: Propagation and mechanism of decadal upper ocean variability in the North Pacific. *Geophys. Res. Lett.* **26**, 739-742

1997

- Liu, Z. and B. Huang, 1997: A coupled theory of tropical climatology: Warm pool, cold tongue and Walker Circulation. *J. Clim.* **10**, 1662-1679.
- Liu, Z., 1997: Oceanic regulation of the atmospheric Walker circulation. *Bull. Amer. Meteor. Soc.* **78**, 407-412.
- Yang, H. and Z. Liu, 1997: Three-dimensional chaotic ocean transport: the Great Ocean Barrier. *J. Phys. Oceanogr.* **27**, 1258-1273.
- Liu, Z., 1997: On the role of stratification in inertial recirculation. *J. Phys. Oceanogr.* **17**, 926-940

Kutzbach J. and **Z. Liu**, 1997: Oceanic feedback on the western African monsoon at 6000 BP. *Science* **278**, 440-443.

1996

Liu, Z., 1996: On the destruction of inertial recirculation by annual wind migration. *J. Phys. Oceanogr.* **26**, 242-256.

Liu, Z., 1996: Thermocline variability in different dynamic regions. *J. Phys. Oceanogr.* **26**, 1633-1645.

Liu, Z., 1996: Modeling the equatorial annual cycle with a linear coupled model. *J. Clim.* **9**, 2376-2385.

Kutzbach, J., P. Bartlein, J. Foley, S. Harrison, S. Hostetler, **Z. Liu**, E.C. Prentice and T. Webb, 1996: The potential role of vegetation feedback in the climate sensitivity of high-latitude regions: a case study at 6000 years before present. *Global Biogeochemical Cycles* **10**, 727-736

Sun, D. and **Z. Liu**, 1996: Dynamic ocean-atmosphere coupling: a thermostat for the tropics. *Science* **272**, 1148-1150.

1995

Liu, Z. and S.G.H. Philander, 1995: How different wind patterns affect the tropical-subtropical thermocline circulation in the upper ocean. *J. Phys. Oceanogr.* **25**, 449-462.

1994

Liu, Z. and J. Pedlosky, 1994: Thermocline forced by annual and decadal surface temperature variation. *J. Phys. Oceanogr.* **24**, 587-608,

Liu, Z. and S. Xie, 1994: Equatorward propagation of coupled air-sea disturbances with application to the annual cycle of the eastern tropical Pacific. *J. Atmos. Sci.* **51**, 3807-3822.

Liu, Z. and H. Yang, 1994: Intergyre chaotic transport. *J. Phys. Oceanogr.* **24**, 1768-1782.

Yang, H. and **Z. Liu**, 1994: Chaotic transport in ocean gyres. *Geophys. Res. Lett.* **21**, 545-548.

Liu, Z., 1994: A simple model of the mass exchange between the subtropical and tropical ocean. *J. Phys. Oceanogr.* **24**, 1153-1165.

Liu, Z., S. Philander and R. Pacanowski, 1994: A GCM study of tropical-subtropical upper ocean mass exchange. *J. Phys. Oceanogr.* **24**, 2606-2623.

1993

Liu, Z., 1993: Thermocline forced by varying wind. I: spin-up and spin-down. *J. Phys. Oceanogr.* **23**, 2505-2522,

Liu, Z., 1993: Thermocline forced by varying wind. II: annual and decadal Ekman pumping. *J. Phys. Oceanogr.* **23**, 2523-2541,

Liu, Z., 1993: Interannual positive feedbacks in a simple extratropical air-sea coupling system. *J. Atmos. Sci.* **50**, 3022-3028.

Liu, Z., 1993: Interannual planetary wave breaking in the presence of mean Ekman pumping and flow. *J. Fluid Mechanics* **253**, 45-65

Liu Z., 1993: Penetration of interannual planetary waves across a gyre boundary. *Dyn. Atmos. Ocean* **17**, 169-186.

Liu, Z., J. Pedlosky, D. Marshall, T. Warnocke, 1993: On the feedback of the Rhines-Young pool on the ventilated thermocline. *J. Phys. Oceanogr.* **23**, 1592-1596,

Liu, Z., 1993: A note on intergyre mass exchange due to a migrating wind. *Dyn. Atmos. Ocean*, **17**, 157-167

1990

Liu Z. 1990: On the influence of the continental slope on the inertial western boundary current--the enhanced transport and recirculation. *J. Mar. Res.* **48**, 254-284

1989

Liu Z. 1989: Orographically forced oscillation in a barotropic atmosphere. *Scientia Atmospherica Sinica* **13**, 166-177.

Book Chapters

Jomelli, V., Favier V., D. Brunstein, F. He and **Z. Liu**, 2016: High altitude temperatures in the tropical Andes over the last 15,000 years estimated from a glacial model. *Glaciers: Formation, Climate Change and their Effects*, Chap.3. 53-70. Edited by Nicholas Doyle, 2016 Nova Science Publishers, ISBN: 978-1-63484-941-8

Liu Z., 2015: A review of the dynamics of Pacific interdecadal climate variability. *Climate Change: Multidecadal and Beyond. World Scientific Series on Asia-Pacific Weather and Climate, Vol.6*, C. P. Chang ed. 159-170.

Liu, Z. and P. Braconnot. 2012: Modelling of tropical environment during the Quaternary. Chapter 9 in “*Quaternary Environmental Changes in the Tropics*”, ed. Sarah Metcalfe and David. Nelsh., Wiley-Blackwell.

Braconnot, P., S.P. Harrison, S. Joussaume, C.D. Hewitt, A. Kitoh, J.E. Kutzbach, **Z. Liu**, B. Otto-Bliesner, J. Syktus, and N. Weber, 2004: Evaluation of PMIP coupled ocean-atmosphere simulations of the mid-Holocene. In: *Past Climate Variability through Europe and Africa*, R.W. Battarbee et al. (eds), Springer, Dordrecht, The Netherlands, 515-533

Zhu B.Z., F.F. Jin and **Z. Liu**. 1990: An introduction to the nonlinear dynamics of the atmosphere and ocean. (in Chinese). *China Ocean Press*. 328pp