

## Jiafu Mao

Scientist

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## Education and Training

2001.9-2007.3	Institute of Atmospheric Physics, Chinese Academy of Sciences, Atmospheric Sciences, Combined MA-PHD
1997.9-2001.9	Nanjing University of Information Science and Technology (Nanjing Institute of Meteorology), Meteorology, B.S.

## Research and Professional Experience

2011.11-present	Scientist Ecosystems Simulations Science group in the Environmental Sciences Division, ORNL
2009.8-2011.11	Postdoctoral Research Fellow ORAU/ORNL Integration of IMAGE and GCAM with CESM1 I worked with Peter E. Thornton, Xiaoying Shi, Forrest M. Hoffman and other collaborators on the LDRD and multi-DOE lab project. We coupled the global land use and land cover change models (IMAGE and GCAM) with the latest CESM1 model to research on the controls on future greenhouse gas concentrations and climate-biosphere feedbacks by the introduction of human dimension in the complex earth system model. The related modeling structure was employed and extended to a larger DOE-funded iESM project.
2008.1-2009.8	Joint Postdoctoral Research Fellow The University of New South Wales and CSIRO The linkage of CABLE and NCAR-DGVM with MK3L, and the application of the coupled models I worked with Andrew J. Pitman, Yingping Wang, Steven Phipps and Gab Abramowitz on the linkage of latest CABLE model with MK3L. Then I incorporated the NCAR-DGVM into the coupled CABLE-Mk3L. After systematic evaluations of Mk3L-CABLE and Mk3L-CABLE-DGVM, I applied them for carbon and water simulations on different temporal and spatial scales.
2006.10-2008.1	Assistant Scientist LASG/IAP, CAS Improvements and simulations of M-SDGVM over China Collaborated with Bin Wang, Yongjiu Dai and F. Ian Woodward, I developed the updated version of SDGVM model over continental China. The M-SDGVM (Modified SDGVM) was comprehensively calibrated using observed sites and regional carbon and water data over China, and applied in the studies for the changes of carbon storage and fluxes.

## Technical Skills

1. Familiar with the structure and operation of CSIRO Mk3L, CESM, CLM, NCAR-DGVM,

- CoLM (Common Land Model), AVIM, LPJ, SDGVM, M-SDGVM, ED and ED-JULES
- Working knowledge of various operation systems and softwares such as LINUX, Windows operating systems, Fortran 95, C Language, NCL, Ferret, MatLab, Origin and R
  - Good experience in large dataset management, utilization, diagnostics and visualization.

## Publications

- Jiafu Mao**, Xiaoying Shi, Peter E. Thornton, Forrest M. Hoffman, Zaichun Zhu and Ranga B. Myneni. 2012. Global latitudinal-asymmetric vegetation growth trends and their driving mechanisms: 1982-2009. Finished and to be submitted to the Remote Sensing.
- Edmonds, James; Jones, Andrew; Collins, William; Thornton, Peter; Janetos, Anthony; Bond-Lamberty, Ben; Calvin, Katherine; Chini, Louise; Hurtt, George; **Mao, Jiafu**; Shi, Xiaoying; Thomson, Allison; Wise, Marshall; M. Torn. 2012. Land-use policy complicates radiative forcing and the IPCC climate assessment process. Submitted to Nature Climate Change.
- Jones, A. D., Collins, W.D., Edmonds, J., Torn, M.S., Janetos, A.C., Calvin, K., Thomson, A., Chini, L., **Mao, J.**, Shi, X., Thornton, P., Hurtt, G. C. and Wise, M, 2012. Greenhouse gas policy influences climate via direct effects of land-use change. Journal of Climate, accepted.
- Wang Dali, Xiaoying Shi, Daniel Ricciuto, **Jiafu Mao** and Jens Domke, 2012. A Sensitive Analysis Framework for Global Offline Community Land Model Simulation. Submitted to International Journal of High Performance Computing Applications
- Mao Jiafu**, Peter E. Thornton, Xiaoying Shi, Maosheng Zhao and Wilfred M. Post, 2012. Remote sensing evaluation of CLM4 GPP for the period 2000 to 2009. Journal of Climate, 25, 5327-5342.
- Mao Jiafu**, Xiaoying Shi, Peter E. Thornton, Shilong Piao and Xuhui Wang, 2012. Causes of spring vegetation growth trends in the northern mid-high latitudes from 1982 to 2004, 2012. Environmental Research Letters, 7 014010 doi:10.1088/1748-9326/7/1/014010.
- Piao Shilong, A.Ito, S.Li, Y.Huang, P.Ciais, X.Wang, S.Peng, R R. J. Andres, J. Fang, S. Jeong, **J. Mao**, A. Mohammat, H. Muraoka, H. Nan, C. Peng, P. Peylin, X. Shi, S. Sitch, S. Tao, H. Tian, M. Xu, G. Yu, N. Zeng, and B. Zhu, 2012. The carbon budget of the terrestrial ecosystems in East Asia over the last two decades. Biogeosciences Discuss., 9, 4025-4066
- Mao Jiafu**, Steven Phipps, Andrew J. Pitman, Yingping Wang and Bernard Pak, 2011. The CSIRO Mk3L climate system model v1.0 coupled to the CABLE land surface scheme v1.4b: evaluation of the control climatology, Geoscientific Model Development 4: 1115-1131.
- Shi Xiaoying, **Jiafu Mao**, Yingping Wang, Yongjiu Dai and Xuli Tang, 2011. Coupling a Terrestrial Biogeochemical model to the Common Land Model, Advances in Atmospheric Sciences 28(5): 1-14.
- Shi Xiaoying, **Jiafu Mao**, Peter E. Thornton and Forrest m. Hoffman and Wilfred M. Post, 2011. The impact of climate change, CO<sub>2</sub>, nitrogen deposition and land use change on contemporary global river flow, Geophysical Research Letters 38, L08704, doi:10.1029/2011GL046773.
- Mao Jiafu**, Andrew J. Pitman, Steven J. Phipps, Gab Abramowitz and Yingping Wang, 2010. Global and regional coupled climate sensitivity to the parameterization of rainfall interception. Climate Dynamics DOI: 10.1007/s00382-010-0862-7.
- Mao Jiafu**, Xiaoying Shi, Lijuan Ma, Dale P. Kaiser, Qingxiang Li and Peter E. Thornton, 2010. Assessment of re-analysis daily extreme temperatures with China's homogenized historical dataset during 1979 to 2001 using Probability Density Functions, Journal of Climate 23(24): 6605-6623.
- Mao Jiafu**, Li Dan, Bin Wang and Yongjiu Dai, 2010. Simulation and evaluation of

- terrestrial ecosystem NPP with M-SDGVM over continental China, *Advances in Atmospheric Sciences* 27(2): 427-442.
14. **Mao Jiafu**, Bin Wang and Yongjiu Dai, 2009. Sensitivity of the carbon storage of potential vegetation to historical climate variability and CO<sub>2</sub> in continental China, *Advances in Atmospheric Sciences* 26(1): 87-100.
  15. Zhang Hailing, Bin Wang and **Jiafu Mao**, 2009. A Generalized Approach of Three-dimensional Variational Data Assimilation for Land Surface Air Temperature and Its Tests under Simplification Cases, *Climatic and Environmental Research* (in Chinese with English Abstract) 14(3): 273-283.
  16. Shi Xiaoying, Xiaohui Shi and **Jiafu Mao**, 2009. Interdecadal variation of Water Vapor Transport over East Asia and Its Impacts on Rainfall over Eastern China in summer (in Chinese with English Abstract), *Acta Geographica Sinica* 64(7): 861-870.
  17. **Mao Jiafu**, Bin Wang, Yongjiu Dai, and Morales Pablo, 2008. Simulations of carbon and water fluxes with the M-SDGVM in major European forest biomes, *Chinese Journal of Atmospheric Sciences* (in Chinese with English Abstract) 32(6): 1379-1391.
  18. **Mao Jiafu**, Bin Wang, Yongjiu Dai, F. I. Woodward, P. J. Hanson and M. R. Lormas, 2007. Improvements of a dynamic global vegetation model and simulations of carbon and water at an upland-oak forest, *Advances in Atmospheric Sciences* 24 (2): 311-322.
  19. **Mao Jiafu**, Bin Wang and Yongjiu Dai, 2006. Perspective on terrestrial ecosystem models and their coupling with climate system models, *Climatic and Environmental Research* (in Chinese with English Abstract) 11(6): 75-83.
  20. **Mao Jiafu**, Bin Wang, Li Dan and Yinpeng Li, 2005. Coupling of an Atmosphere-Vegetation Interaction Model (AVIM) to a New Generation Grid Point Atmospheric General Circulation Model (GAMIL), *Chinese Journal of Atmospheric Sciences* (in Chinese with English Abstract) 29(6): 897-910.

## Academic activities

1. Hoffman, Forrest M., James T. Randerson, and **Jiafu Mao**. September 14, 2012. "Using Remotely-sensed Data Sets for Model Evaluation and Benchmarking." ForestSAT 2012 (September 11–14, 2012), Oregon State University, Corvallis, Oregon, USA. Invited.
2. **Mao Jiafu** et al. Remote sensing evaluation of CLM4. Jan, 2012, CCSI SAB meeting.
3. **Mao Jiafu** et al. Remote sensing evaluation of CLM4. April, 2012, TES Principal Investigator's Meeting, Washington DC.
4. **Mao Jiafu** et al. Simulation and improvement of CLM4 based on 13CO<sub>2</sub> and shading manipulations in a pine stand. April, 2012, TES Principal Investigator's Meeting, Washington DC.
5. Xiaoying Shi, **Mao, J.** et al. The impact of climate change, CO<sub>2</sub>, nitrogen deposition and land use change on contemporary global river flow. April, 2012, TES Principal Investigator's Meeting, Washington DC.
6. Jeff Warren et al. Partitioning in Trees and Soils (PiTS): A field research facility for testing dynamic carbon partitioning representations within global models. April, 2012, TES Principal Investigator's Meeting, Washington DC.
7. Hayes et al. Global carbon cycle model development, application and evaluation. April, 2012, TES Principal Investigator's Meeting, Washington DC.
8. **Mao Jiafu** et al. Two-layer treatment of litter and soil organic matter pools and fluxes for CLM. Feb. 2012, Joint Land, Biogeochemistry, and Chemistry-Climate Working Groups NCAR, Boulder, CO.
9. **Mao Jiafu** et al. Comparison of CLM predicted GPP, LAI, and NDVI against remote sensing-based estimates. Feb. 2012, Joint Land, Biogeochemistry, and Chemistry-Climate Working Groups NCAR, Boulder, CO.

10. Thornton, P.E., **Mao, J**, Shi, X. et al Influence of prognostic land use on 21st century climate prediction. December 2011, AGU Fall Meeting. Invited
11. **Mao Jiafu**, Xiaoying Shi, Peter E. Thornton, Shilong Piao and Xuhui Wang. Causes of spring vegetation growth in the northern mid-high latitudes from 1982 to 2004. December 2011, AGU Fall Meeting.
12. Jones, A. D., Collins, W.D., Edmonds, J., Torn, M.S., Janetos, A.C., Calvin, K., Thomson, A., Chini, L., **Mao, J.**, Shi, X., Thornton, P., Hurtt, G. C. and Wise, M. Greenhouse gas policy influences climate via direct effects of land-use change. December 2011, AGU Fall Meeting.
13. Xiaoying Shi, **Mao, J**. et al. Runoff of the 20th and 21st centuries simulated by CESM1. December 2011, AGU Fall Meeting.
14. **Mao Jiafu** and coauthors, 2011. Remote sensing evaluation of CLM4, presentation on the 16th Annual CESM Workshop, Breckenridge, CO, June, 2011
15. **Mao Jiafu** and coauthors, 2011. The impact of climate, CO<sub>2</sub>, nitrogen deposition and land use change on simulated contemporary global river flow, presentation on CESM Land Model Working Group Meeting, Boulder, CO, March, 2011
16. **Mao Jiafu** and coauthors, 2011. ORNL progress in the IESM project, presentation on CESM Land Model Working Group Meeting, Boulder, CO, March, 2011
17. **Mao Jiafu** and coauthors, 2010. Remote sensing evaluation of CLMCN GPP, poster presented to American Geophysical Union, Fall Meeting 2010, San Francisco, CA, December, 2010
18. **Mao Jiafu** and coauthors, 2010. The progress of prognostic land use and land cover change in CESM1, presentation on the 15th Annual CCSM Workshop, Breckenridge, CO, June, 2010
19. US-China Workshop on the Climate-Energy Nexus, Oak Ridge, USA, November 11 to November 13, 2009.
20. North American Carbon Program Second Joint Workshop Site-level Interim Synthesis Regional and Continental Interim Synthesis, Oak Ridge, USA, November 9 to November 11, 2009.
21. Visiting scientist, March 2007 to August 2007, Center for Terrestrial Carbon Dynamics (CTCD, NERC), Sheffield University, UK
22. **Mao Jiafu** and coauthors, 2006. Improvements of a dynamic global vegetation model and simulations of carbon and water from stand point to region, poster presented to International Conference on Regional Carbon Budgets, Beijing, China, August 16 to August 18, 2006
23. The international summer school of Climate Change Science for International Graduate Students, Beijing, China, July 30 to August 12, 2006
24. **Mao Jiafu** and coauthors, 2006. Improvements of a dynamic global vegetation model and simulations of carbon and water at an upland-oak forest, presentation on the University Allied Workshop for Climate and Environmental Modeling (UAW), Taiwan, July, 2006
25. **Mao Jiafu** and coauthors, 2006. Perspective of Dynamic Global Vegetation Models and Their Coupling with Climate System Model, presentation on the forth allied workshop of LASG/CAS and Nanjing University on the development of climate system model, Shaoxing, China, May, 2006
26. **Mao Jiafu** and coauthors, 2005. The sensitivity of a dynamic global vegetation model to historical climate variability and CO<sub>2</sub> in the conterminous China, poster presented to the forth CTWF (which is organized by Chinese Academy of Sciences (CAS), Third World Academy of Sciences (TWAS), World Meteorological Organization (WMO).) international workshop on Land Surface Models and Their Applications, Zhuhai, China,

November, 2005

27. Visiting scientist, June 2005 to August 2005, Center for Terrestrial Carbon Dynamics (CTCD, NERC), Sheffield University, UK
28. **Mao Jiafu** and coauthors, 2004. Coupling of an Atmosphere-Vegetation Interaction Model (AVIM) to a New Generation Grid Point Atmospheric General Circulation Model (GAMIL), presentation on the 8th meeting of Chinese outstanding youth scientist of atmospheric science, Chengdu Province, China, July, 2004
29. The international summer school of Climate System and Climate Modeling, Beijing, China, June, 2004
30. **Mao Jiafu** and coauthors, 2003. Land surface models and their coupling with GCM, presentation on the workshop of '973' project of large dataset management, Hunan Province, China, September, 2003.

## **Collaborators**

Peter E. Thornton (ORNL); Xiaoying Shi (ORNL); Forrest M. Hoffman (ORNL); Dan Ricciuto (ORNL); Mac Post (ORNL); Elke Stehfest (NEPA); Andrew J. Pitman (UNSW); Yingping Wang (CSIRO); Steven Phipps (UNSW); Gab Abramowitz (UNSW); Bernard Pak (CSIRO); F. Ian Woodward (Sheffield U); Bin Wang (LASG/IAP); Yongjiu Dai (BNU); Li Dan (IAP)

## **Graduate and Postdoctoral Advisors**

Postdoctoral Advisors in US: Peter E. Thornton (ORNL)

Postdoctoral Advisors in Australia: Andrew J. Pitman (UNSW) and Yingping Wang (CSIRO)

Graduate Advisor in China: Bin Wang (LASG/IAP) and Yongjiu Dai (BNU)

(updated on 10/16/2012)