

Geophysical Fluid Dynamics Laboratory
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Education

M.A., Astronomy, 1985, Columbia University, New York.
B.A., (double major) Applied Mathematics, Physics, 1983, Barnard College, New York.

- Second alternate for Grace Potter Rice Fellowship.
- Honors in Applied Mathematics.
- Dean's List: 1979-1982.

Employment/Professional Experience

Geophysical Fluid Dynamics Laboratory/NOAA, Princeton, New Jersey.
11/06-present: Research Physical Scientist, Biogeochemistry, Ecosystems and Climate Group
Berkeley Atmospheric Sciences Center, Dept. of Earth and Planetary Science, University of California, Berkeley.
6/98-11/06: Programmer/Analyst III, Carbon-Climate Interactions Group.
Department of Applied Physics & Nuclear Engineering, Columbia University.
7/92-5/98: Senior Staff Associate, Carbon-Climate Interactions Group and Biogeochemical Cycles Group, Resident at NASA/Goddard Institute for Space Studies, New York (6/86-5/95), and University of Victoria, Victoria, B.C., Canada (6/95-5/98).
7/87-6/92: Staff Associate, Biogeochemical Cycles Group, Resident at NASA/GISS, New York.
6/86-6/87: Senior Staff Research Assistant, Biogeochemical Cycles Group, Resident at NASA/GISS, New York.
Barnard College Work Study, Resident at NASA/Goddard Institute for Space Studies, New York.
6/82-5/84: Programmer/Research Assistant, Cloud Climatology Group.

Technical Experience

Hardware: CRAY XT6, SGI Altix, IBM RS/6000, SUN, SGI Origin, IBM-SP, CRAY J-90/PVP.

Operating Systems: UNIX, Linux, Windows, Mac OS-X, MS-DOS, VM/CMS.

Software: FERRET, NCO, IDL, MATLAB, NCL, CDAT, NCARGraphics, MS Office, Adobe Illustrator.

Models:

GFDL ESM2M, ESM2G, ESM2.5M, ESM2.1, CM2M, CM2G, AM2, MOM4p1, GOLD, LM3, LM3v, SIS.

NCAR CCSM, CAM, CCM3, NCOM, POP, LSM, CLM, MATCH.

GISS CGCM, GISS-UCB TTM, AGCM, Bryan-Cox OGCM.

Other CASA, SLAVE, CENTURY, SiB.

Languages: Fortran 77, Fortran 90, C, HTML.

Professional Society Memberships

American Geophysical Union (AGU)
Earth Science Women's Network (ESWN)

Publications

- John, J. G., A. M. Fiore, V. Naik, L. W. Horowitz, and J. P. Dunne: Climate versus emission drivers of methane lifetime from 1860-2100, *Atmos. Chem. Phys. Discuss.*, 12, 18067-18105, doi:10.5194/acpd-12-18067-2012, 2012.
- Stock, C. A., J. P. Dunne and J. G. John: Global scale carbon and energy flows through the planktonic food web: an analysis with a coupled physical-biological model, submitted.
- Dunne, J. P., J. G. John, E. N. Shevliakova, R. J. Stouffer, et al.: GFDL's ESM2 global coupled climate-carbon Earth System Models Part II: Carbon System formulation and baseline simulation characteristics, *J. Climate*, in press, doi:10.1175/JCLI-D-12-00150.1. 10/12.
- Dunne, J. P., J. G. John, A. J. Adcroft, S. M. Griffies, R. W. Hallberg, E. N. Shevliakova, R. J. Stouffer, et al.: GFDL's ESM2 global coupled climate-carbon Earth System Models Part I: Physical formulation and baseline simulation characteristics, *J. Climate*, 25(19), doi:10.1175/JCLI-D-11-00560.1, 2012.
- Gnanadesikan, A., J. P. Dunne and J. John, Understanding why the volume of suboxic waters does not increase over centuries of global warming in an Earth System Model, *Biogeosciences*, 9, 1159-1172, doi:10.5194/bg-9-1159-2012, 2012.
- Gnanadesikan, A., J. P. Dunne, and J. John: What ocean biogeochemical models can tell us about bottom-up control of ecosystem variability, *ICES Journal of Marine Science*, 68, 1030-1044, 2011.

- Henson, S. A., J. L. Sarmiento, J. P. Dunne, L. Bopp, I. Lima, S. C. Doney, J. John, and C. Beaulieu: Detection of anthropogenic climate change in satellite records of ocean chlorophyll and productivity, *Biogeosciences*, 7, 621-640, doi:10.5194/bg-7-621-2010, 2010.
- Hoffman, F., I. Fung, J. Randerson, P. Thornton, J. Foley, C. Covey, J. John, et al.: Terrestrial biogeochemistry in the community climate system model (CCSM), *Journal of Physics: Conference Series*, 46, 363-369, 2006.
- Patra, P. K. et al.: Sensitivity of inverse estimation of annual mean CO₂ sources and sinks to ocean-only sites versus all-sites observational networks, *Geophys. Res. Lett.*, 31, L05814, 2006.
- Friedlingstein, P., et al.: Climate–Carbon Cycle Feedback Analysis: Results from the C4MIP Model Intercomparison, *J. Climate*, 19, 3337–3353, doi: 10.1175/JCLI3800.1, 2006.
- Doney, S. C., K. Lindsay, I. Fung and J. John: Natural Variability in a Stable, 1000-Year Global Coupled Climate–Carbon Cycle Simulation, *J. Climate*, 19, 3033-3054, 2006.
- Baker, D. F. et al.: TransCom3 inversion intercomparison: Impact of transport model errors on the interannual variability of regional CO₂ fluxes, 1988-2003, *Global Biogeochem. Cycles*, 20, GB1002, doi: 10.1029/2004GB002439, 2006.
- Fung, I., S. Doney, K. Lindsay and J. John: Evolution of carbon sinks in a changing climate. *Proc. Nat. Acad. Sci.*, 102, 32, 11201-11206, 2005.
- Bonfils, C., I. Fung, S. Doney and J. John: On the detection of summertime terrestrial photosynthetic variability from its atmospheric signature, *Geophys. Res. Lett.*, 31, L09207, doi:10.1029/2004GL019453, 2004.
- Maksyutov, S., and Transcom-3 Modelers: Effect of recent observations on Asian CO₂ flux estimates by transport model inversions, *Tellus*, 55B, 522-529, 2003.
- Gurney, K. R., R. M. Law and TransCom3 modellers: Transcom3 inversion intercomparison: Model mean results for the estimation of seasonal carbon sources and sinks, *Global Biogeochem. Cycles*, 18, GB1010, doi:10.1029/2003GB002111, 2004.
- Law, R. M., Y.-H. Chen, K. R. Gurney and Transcom 3 Modellers: TransCom3 CO₂ inversion intercomparison: 2. Sensitivity of annual mean results to data choices, *Tellus B*, 55: 580-595. doi: 10.1034/j.1600-0889.2003.00053.x, 2003.
- Gurney, K. R., et al.: TransCom3 CO₂ inversion intercomparison: 1. Annual mean control results and sensitivity to transport and prior flux information, *Tellus Series B*, 55(2), 555-579, 2003.
- Gurney, K. R., R. M. Law and TransCom3 modellers: Towards robust regional estimates of CO₂ sources and sinks using atmospheric transport models, *Nature*, 415, 626-630, 2002.
- Fung, I., S. K. Meyn, I. Tegen, S. C. Doney, J. G. John, and J. K. B. Bishop: Iron supply and demand in the upper ocean, *Global Biogeochem. Cycles*, 14, 281-295, 2000. Correction in *GBC*, 14, 697-700.
- Gajewski, K. R. et al.: The climate of North America and adjacent ocean waters ca 6 ka, *Canadian J. Earth Sci.*, 37, 661-681, 2000.
- Fung, I., C. B. Field, J. A. Berry, M. V. Thompson, J. T. Randerson, C. M. Malmstrom, P. M. Vitousek, G. J. Collatz, P. J. Sellers, D. A. Randall, A. S. Denning, F. Badeck and J. John: Carbon 13 exchanges between the atmosphere and biosphere, *Global Biogeochem. Cycles*, 11, 507-533, 1997.
- Friedlingstein, P., I. Fung, E. Holland, J. John, G. Brasseur, D. Erickson and D. Schimel: On the contribution of CO₂ fertilization to the missing biospheric sink, *Global Biogeochem. Cycles*, 9, 541-556, 1995.
- Friedlingstein, P., K. C. Prentice, I. Y. Fung, J. G. John and G. P. Brasseur: Carbon biosphere-climate interactions in the last glacial maximum climate, *J. Geophys. Res.*, 100, 7203-7221, 1993.
- Bouwman, A. F., I. Fung, E. Matthews and J. John: Global analysis of the potential for N₂O production in natural soils, *Global Biogeochem. Cycles*, 7, 557-597, 1993.
- Matthews, E., J. John and I. Fung: Rice Cultivation and Methane Emission, Documentation of Distributed Geographic Data Sets, *NASA Technical Memorandum* 104595, 1993.
- Fung, I., J. John, J. Lerner, E. Matthews, M. Prather, L. P. Steele and P. J. Fraser: Three-dimensional model synthesis of the global methane cycle, *J. Geophys. Res.*, 96, 13033-13065, 1991.
- Fung, I. and J. John: Interannual and longer-term changes of the terrestrial biosphere and their relationships to atmospheric CO₂ variations. In: *Proceedings of Third International Conference on Analysis and Evaluation of Atmospheric CO₂ Data Present and Past, Environmental Pollution Monitoring and Research Programme No. 59*, World Meteorological Organization, 1989.

Acknowledgments*

Acknowledged in these publications for assistance in either execution of model experiments, programming, providing code for analysis and visualization, or with graphics.

- *Lee, J.-E., I. Fung, D. DePaolo and C. C. Henning: Analysis of the global distribution of water isotopes using the NCAR atmospheric general circulation model, *J. Geophys. Res.*, 112, doi:10.1029/2006JD007657, 2007.
- *Angert, A., S. Biraud , C. Bonfils , C. Henning , W. Buermann , J. Pinzon , C. Tucker , I. Fung: Drier summers cancel out the CO₂ uptake enhancement induced by warmer springs, *Proc. Nat. Acad. Sci.*, 102, 10823-10827, 2005.
- *Lintner, B., A. Gilliland, I. Fung: Mechanisms of convection-induced modulation of passive tracer interhemispheric transport interannual variability, *J. Geophys. Res.*, 109, doi:10.1029/2003JD004306, 2004.

- *Still, C. J., J. T. Randerson and I. Y. Fung: Large-scale plant light-use efficiency inferred from the seasonal cycle of atmospheric CO₂, *Global Change Biology*, 10, 1240-1252, 2004. Erratum: Still, C. J., Randerson, J. T., and I. Y. Fung: Erratum: Large-scale plant light-use efficiency inferred from the seasonal cycle of atmospheric CO₂, *Global Change Biology* 11(10), 1866-1866, 2005.
- *Randerson, J. T., I. G. Enting, E. A. G. Schuur, K. Caldeira and I. Y. Fung: Seasonal and latitudinal variability of troposphere Δ14CO₂: Post bomb contributions from fossil fuels, oceans, the stratosphere, and the terrestrial biosphere, *Global Biogeochem. Cycles*, 16, 4, 1112, doi:10.1029/2002GB001876, 2002.
- *Denning, A. S., M. Holzer, K. Gurney, M. Heimann, R. Law, P. Rayner, I. Fung, S.-M. Fan, S. Taguchi, P. Friedlingstein, Y. Balkanski, M. Maiss and I. Levin: Three-dimensional transport and concentration of SF6: A model intercomparison study (TransCom2), *Tellus*, 51B, 266-297, 1999.
- *Dai, A., I. Y. Fung, A. D. Del Genio: Surface observed global land precipitation variations during 1900–88: *J. Climate*, 10, 2943–2962, 1997.
- *Matthews, E.: Global litter production, pools, and turnover times: Estimates from measurement data and regression models, *J. Geophys. Res.*, 102, 18,771-18,800, 1997.
- *Randerson, J. T., M. V. Thompson, T. J. Conway, I. Y. Fung and C. B. Field: The contribution of terrestrial sources and sinks to trends in the seasonal cycle of atmospheric carbon dioxide, *Global Biogeochem. Cycles*, 11(4), 535–560, doi:10.1029/97GB02268, 1997.
- *Malmstrom, C. M., M. V. Thompson, G. P. Juday, S. O. Los, J. T. Randerson and C. B. Field: Interannual variation in global-scale net primary production: Testing model estimates, *Global Biogeochem. Cycles* 11(3):367–392, 1997.
- *Randerson, J. T., M. V. Thompson, C. M. Malmstrom, C. B. Field and I. Fung: Substrate limitations for heterotrophs: Implications for models that estimate the seasonal cycle of atmospheric CO₂, *Global Biogeochem. Cycles*, 10, 585-602, 1996.
- *DeFries, R. S., et al.: Mapping the land surface for global atmosphere-biosphere models: Toward continuous distributions of vegetation's functional properties, *J. Geophys. Res.* 100(D10), 20,867-20,882, doi:10.1029/95JD01536, 1995.
- *Gornitz, V. and I. Fung: Potential distribution of methane hydrates in the world's oceans, *Global Biogeochem. Cycles*, 8, 335-347, 1994.
- *Matthews, E.: Nitrogenous fertilizers: Global distribution of consumption and associated emissions of nitrous oxide and ammonia, *Global Biogeochem. Cycles*, 8, 4, 411-439, 1994.
- *Dai, A. G. and I. Fung: Can climate variability contribute to the "missing" CO₂ sink?, *Global Biogeochem. Cycles*, 7, 599-609, 1993.
- *Chappellaz, J. A., I. Y. Fung and A. M. Thompson: Atmospheric CH₄ increase since the Last Glacial Maximum: 1. Source estimates, *Tellus*, 45B, 228-241, 1993.
- *Matthews, E., I. Fung and J. Lerner: Methane emission from rice cultivation: Geographic and seasonal distribution of cultivated areas and emissions, *Global Biogeochem. Cycles*, 5, 3-24, 1991.
- *Prentice K. and I. Fung: The sensitivity of terrestrial carbon storage to climate change, *Nature*, 346, 48-51, 1990.
- *Prentice, K.C.: Bioclimatic Distribution of Vegetation for General Circulation Model Studies, *J. Geophys. Res.*, 95(D8), 11,811-11,830, doi:10.1029/JD095iD08p11811, 1990.
- *Tans, P., I. Fung and T. Takahashi: Observational constraints on the global atmospheric CO₂ budget, *Science*, 247, 1431-1438, 1990.
- *Fung, I.: An Earth Atlas. An unpublished atlas compiled and produced to celebrate the 65th birthday of Professor Bert Bolin, 1990.

Presentations (* indicates poster presentation)

- "Land carbon-climate interactions: GFDL Earth System Model (ESM) analysis", GFDL, May 2012.
- **Key Drivers of Methane Lifetime from 1860-2100", AGU, Fall 2011.
- **How Coupled are Ocean Heat and Carbon Uptake?", AGU, Fall 2010.
- "NCAR CCSM Coupled Carbon-Climate Model: Development, Implementation, and Assessment", GFDL, September 2006.

Outreach

- 2011 Young Women's Conference in Science, Engineering, Technology and Mathematics, Princeton Plasma Physics Laboratory – Poster Presentation: "Projecting the Future with Earth System Modeling"
- 2010 Young Women's Conference in Science, Engineering, Technology and Mathematics, Princeton Plasma Physics Laboratory – Poster Presentation: "Projecting the Future with Climate and Earth System Modeling"