

Shuguang “Leo” Liu

Title: Research Ecologist, Project Lead on Carbon Cycle and Global Change
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Education and/or Training

Ph.D., 1996, University of Florida, Forest Ecology and Hydrology
M.S., 1987, Beijing Forestry University, Forest Ecology
B.A., 1984, Central-South Forestry University, Forest Science

Professional Experience

2008.6- Research Ecologist, USGS/EROS Center, Sioux Falls, SD
2008-2008 Environmental Scientist, ARTS, contractor to USGS EROS Center, Sioux Falls, SD
2007-2008 Sr. Prin. Scientist, SAIC, contractor to USGS EROS Center, Sioux Falls, SD
2002-2007 Principal Scientist, SAIC, contractor to USGS EROS Center, Sioux Falls, SD
2004- Professor, GIScCE, South Dakota State University, Brookings, SD
2003- Honorable Professor, South China Botanic Garden, Chinese Academy of Sciences, China
2003- Adviser, US National Research Council
1998-2002 Senior Scientist, Raytheon, contractor to USGS EROS Center, Sioux Falls, SD
1996-1998 Postdoc Fellow, Department of Botany, University of Wyoming, Laramie, WY
1987-1992 Research Scientist, Chinese Academy of Sciences, Beijing, China
1987-1992 Research Scientist, State Planning Commission, Beijing, China

Areas of Specialization and Research/Support Responsibilities

Dr. Liu is leading an interdisciplinary team to develop advanced data assimilation systems to improve the monitoring and forecast of land surface conditions including carbon sources and sinks, hydrological cycle, and ecosystem goods and services. He developed the Erosion-Deposition-Carbon-Model (EDCM) to dynamically simulate the impact of soil erosion and deposition on carbon dynamics. Dr. Liu also developed the General Ensemble Biogeochemical Modeling System (GEMS) for spatially explicit simulations of the land-atmosphere-human interactions with measurements of uncertainty. He leads an USGS/NASA effort to develop innovative upscaling approaches to quantifying the spatial and temporal dynamic changes of contemporary carbon stocks and fluxes in the US. He has played key roles in several interdisciplinary studies on estimation of carbon sequestration supply and prediction of ecological sustainability under various physical, socioeconomic, and environmental conditions at the regional scale in Central and North America, Asia, and Africa.

Professional Activities and/or Memberships

AAAS, AGU, ESA

Significant Recent Publications (out of more than 50)

Harden, J W, A A Berhe, M Torn, J Harte, S Liu, R.F. Stallard, 2008. Soil erosion: data say C sink. *Science* 320 (April): 178-179

Liu, S., 2008. Quantifying the Spatial Details of Carbon Sequestration Potential and Performance. Book Chapter in *Science and Technology of Carbon Sequestration*, Brian McPherson and Eric Sundquist (eds.), in press.

Chen, M., S. Liu, L.L. Tieszen and D.Y. Hollinger, 2008. An improved state-parameter analysis of

- ecosystem models using data assimilation. *Ecological Modelling*
doi:10.1016/j.ecolmodel.2008.07.013
- Liu, S, P Anderson, B Kauffman, F Hughes, D Schimel, G Zhou, V Watson and J Tosi, 2008. Resolving Model Parameter Values From C and N Stock Measurements in a Wide Range of Tropical Mature Forests Using Nonlinear Inversion and Regression Trees. *Ecological Modelling* doi:10.1016/j.ecolmodel.2008.07.025
- Liu, J., Shuguang Liu, Thomas R. Loveland, Larry L. Tieszen. 2008. Integrating Remotely Sensed Land Cover Observations and a Biogeochemical Model For Estimating Forest Ecosystem Carbon Dynamics. *Ecological Modelling* doi:10.1016/j.ecolmodel.2008.04.019
- Tan, Z., L.L. Tieszen, Z. Zhu, S. Liu, and S. Howard, 2007. An Estimate of Carbon Emissions from 2004 Wildfires across Alaskan Yukon River Basin. *Carbon Balance and Management* 2007, 2:12, doi:10.1186/1750-0680-2-12
- Tan, Z, S Liu, Z Li and T R Loveland, 2007. Simulated responses of soil organic carbon stock to tillage management scenarios in the Northwest Great Plains. *Carbon Balance and Management* 2007, 2:7, doi:10.1186/1750-0680-2-7
- Yuan, W, S Liu, G Zhou, G Zhou, L L Tieszen, D Baldocchi, C Bernhofer, H Gholz, A H Goldstein, M L Goulden, D Y Hollinger, Y Hu, B E Law, P C Stoy, T Vesala, S C Wofsy, 2007. Deriving a Light Use Efficiency Model From Eddy Covariance Flux Data For Predicting Daily Gross Primary Production Across Biomes. *Agricultural and Forest Meteorology* doi:10.1016/j.agrformet.2006.12.001.
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- Tan, Z., S. Liu, C. A. Johnston, J. Liu, and L. L. Tieszen, 2006. Analysis of ecosystem controls on soil carbon source-sink relationships in the northwest Great Plains. *Global Biogeochemical Cycles* 20, GB4012, doi:10.1029/2005GB002610.
- Tan, Z, R. Lal and S. Liu, 2006. Using Experimental and Geospatial Data to Estimate Regional Carbon Sequestration Potential under No-till Management. *Soil Science* 171(12):950-959
- Tang X, Liu S, Zhou G, Zhang D, Zhou C, 2006. Soil-atmospheric exchange of CO₂, CH₄ and N₂O in three forest ecosystems in southern China. *Global Change Biology* 12: 546-560, doi: 10.1111/j.1365-2486.2006.01109.x
- Liu, J. Liu, S. and T. Loveland. 2006. Temporal evolution of carbon budgets of the Appalachian forests in the U.S. from 1972 to 2000. *Forest Ecology and Management* 222: 191-201
- Tan, Z., S. Liu, C. Johnston, T.R. Loveland, L.R. Tieszen, J. Liu and R. Kurtz, 2005. Soil Organic Carbon Dynamics as Related to Land Use History in the Northwestern Great Plains. *Global Biogeochemical Cycles* VOL. 19, GB3011, doi:10.1029/2005GB002536
- Liu, Shuguang, Kaire, Maguette, Wood, Eric, Dialio, Ousmane, Tieszen, Larry, 2004. Impacts of Land Use and climate Change on Carbon Dynamics in South Central Senegal. *Journal of Arid Environments* 59: 583-604
- Liu, Shuguang, Loveland, Thomas R., Kurtz, Rachel, 2004. Contemporary Carbon Dynamics in Terrestrial Ecosystems in the Southeastern Plains of the United States. *Environmental Management* 33: S442-S456
- Kerr, S., S. Liu, R.F. Hughes and A. Pfaff, 2003. Carbon dynamics, land use and biocomplexity: Building a regional scale multidisciplinary model. *Journal of Environmental Management* 69: 25-37
- Liu, S.N. Bliss, E. Sundquist and T.G. Huntington, 2003. Modeling carbon dynamics in vegetation and soil under the impact of soil erosion and deposition. *Global Biogeochemical Cycles*, Vol. 17, No. 2, 1074, doi:10.1029/2002GB002010.
- Reiners, W.A., S. Liu, K.G. Gerow, M. Keller and D.S. Schimel, 2002. Historical and future land use effects on trace gas emissions using an ensemble modeling approach: Costa Rica's

- Caribbean Lowlands as an example. *Global Biogeochemical Cycles* 16: 223-240, 10.1029/2001GB001437.
- Liu, S., 2001. Evaluation of the Liu model for predicting rainfall interception in forests worldwide. *Hydrological Processes* 15: 2341-2360.
- Pfaff, A.S.P., S. Kerr, R.F. Hughes, S. Liu, G.A. Sanchez-Azofeifa, D. Schimel, J.Tosi, V. Watson, 2000. The Kyoto protocol and payments from tropical forest: An interdisciplinary method for estimating carbon-offset supply and increasing the feasibility of a carbon market under the CDM. *Ecological Economics* 35: 203-221.
- Liu, S., W.A. Reiners, M. Keller and D.S. Schimel, 2000. Simulation of nitrous oxide and nitric oxide emissions from tropical moist primary forests in the Costa Rican Atlantic Zone. *Environmental Modelling & Software* 45: 727-743.
- Liu, S., W.A. Reiners, M. Keller and D.S. Schimel, 1999. Model simulation of changes in nitrogen trace gas emissions with conversion of tropical rain forests to pastures in the Costa Rican Atlantic Zone. *Global Biogeochemical Cycles* 13: 663-677.
- Liu, S., H. Riekerk and H. L. Gholz. 1998. Simulation of evapotranspiration from Florida pine flatwoods. *Ecological Modelling* 114: 19-34.