

B&ESD Newsletter **March 2012**

Pubs and Products

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Keppel-Aleks, G., Wennberg, P. O., Washenfelder, R. A., Wunch, D., Schneider, T., Toon, G. C., Andres, R. J., Blavier, J.-F., Connor, B., Davis, K. J., Desai, A. R., Messerschmidt, J., Notholt, J., Roehl, C. M., Sherlock, V., Stephens, B. B., Vay, S. A., and S. C. Wofsy. 2012. The imprint of surface fluxes and transport on variations in total column carbon dioxide. *Biogeosci.* 9:875-891.

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Two major reports completed for DOE Office of Science and the U.S. National Climate Assessment (NCA) on March 1: “Climate Change and Energy Supply and Demand” and “Climate Change and Infrastructure, Urban Systems, and Vulnerabilities.” Both were led by Tom Wilbanks and Sherry Wright with DOE program manager, Bob Vallario.

Notable Achievements

On March 1st Anthony Turhollow, Allen McBride, Tim Theiss, and Keith Kline contributed comments and suggestions for inclusion in the Department of Energy (DOE) review of a draft by the International Energy Agency of their forthcoming Technology Roadmap, “Bioenergy for Heat and Power.”

The poster “The impact of wood particle size and species on size reduction, densification, and ash content” (Coauthors L. J. Naimi, M. Wöhler, S. Sokhansanj, and S. K. Pelz) and paper “Stratification of off-gases in stored wood pellets and aeration/purging system” (Coauthors F. Yazdanpanah, S. Sokhansanj, C. J. Lim, A. Lau, X. Bi, and S. Melin) were presented at the World Sustainable Energy Days, February 29th – March 2nd, Wels, Austria.

Donna Kridelbaugh served as a Rules Judge at the Tennessee Science Bowl held Saturday, March 3rd. Information on volunteering for next year's event and the list of this year's winners can be found online at <http://www.ornl.gov/sciencebowl/>.

On March 5th Mark Downing, Matt Langholtz, and Laurence Eaton participated in the Office of the Biomass Program (OBP) Webinar with environmental non-governmental organizations (NGOs) to review and discuss OBP sustainability activities. The presentation focused on the Billion-Ton Update results.

During March 5th-30th technical exchanges continued with Latin America Caribbean and Africa (LACAF) project leaders from The São Paulo Research Foundation (FAPESP) and with LACAF subproject leaders from the Brazilian Reference Center on Biomass (CENBIO), The State University of Campinas (UNICAMP), and the São Paulo State Environmental Agency (CETESB) to develop a joint LACAF research proposal to FAPESP on bioenergy sustainability water quality issues.

Shahab Sokhansanj presented two posters, "Integrated Biomass Supply Analysis and Logistics (IBSAL) Model to Understand the Biomass Value Chain," and "Design of a cost-efficient agricultural biomass logistics system for bioenergy production" at the Growing the Margins/Canadian Farm and Food Biogas Conferences, London, Ontario. His second poster won first place in a competition at the Conference.

On March 6th Oak Ridge National Laboratory (ORNL) staff met to discuss the research methodology needed to meet the FY12 Joule Milestone related to Sustainability Indicators targets for biomass production. The methodology will be applied targets two representative production cases: Switchgrass in Georgia and Corn Stover in Iowa. Meetings next quarter will include representatives from other labs also involved in the deliverable.

During March 6th-28th a series of conference calls and meetings supported ongoing development including calibration and validation of switchgrass for the high performance computing Environmental Policy Integrated Climate (HPC-EPIC) Global Bioenergy Crop Model. This research is conducted in conjunction with the Global Bioenergy Sustainability (GSB) project involving partners in the European Union (EU) and Brazil.

During March 7th-8th Jeremy Smith was a biology/bioinformatics lecturer and panelist in the Industry-National Laboratory Summit on Modeling and Simulation in Austin, TX. This conference grew out of a meeting in June 2011 between a dozen industry chief technical officers (CTOs) and heads of corporate research, Secretary of Energy Steve Chu, and members of the National Laboratory Directors' Council, to discuss ways to strengthen the nation's innovation ecosystem through increased collaboration. Dr. Chu presented the keynote lecture illustrating ways that DOE computing has made key contributions to industrial designs.

During March 7th-9th in Washington D.C., Colleen Iversen co-organized the "Scaling root processes: Global Impacts" workshop sponsored by the DOE Office of Science. The main goal of the workshop was to bring together a diverse community of scientists with interest in the processes and modeling of root ecology. Colleen gave an invited talk at the workshop, co-authored by Rich Norby, on "Digging deeper: Rooting distributions in forested CO₂-enrichment experiments."

ORNL Distributed Active Archive Center (DAAC) held a monthly telecon with staff from the North American Carbon Program (NACP) Program Office on Thursday, March 8th to discuss

relevant issues pertaining to the coordination of activities, resources, and data products associated with NACP, including the status of data sets submitted to ORNL DAAC for archival.

As a co-supervisor for the University of British Columbia (UBC) doctoral candidate Mahmoud Ebadian, Shahab Sokhansanj participated in reviewing the student's research progress on March 8th. Mahmoud's research topic is "Simulation and optimization of agricultural feedstock value chain for bioenergy."

Bob Cottingham presented his talk "Computational Methods for Detecting Emerging Infectious Disease From High Throughput Omics to Social Media: Integrating Data and Knowledge to Improve Biosurveillance" in the Bioinformatics session at the International Conference on Emerging Infectious Diseases (ICEID) on March 12th. Learn more at <http://www.iceid.org/>.

Sylvia Milanez, Carol Wood, and Cheryl Bast of the Toxicology and Hazard Assessment Team (ESD) attended the 51st annual meeting of The Society of Toxicology (SOT) from March 11th-15th, in San Francisco, CA, and each was first author of a presentation. This is the largest toxicology meeting and exhibition in the world, attracting approximately 6,500 scientists from industry, academia, and government.

On March 13th Rebecca Efrogmson presented "Measuring environmental effects of biofuel production at the BioEnergy Symposium 2012--Transportation Biofuels. Infrastructure, Design, Environment and Sustainability (IDEAS) center at the University of North Carolina at Charlotte. She also served as a panelist on "A Round-Robin Snapshot: Eight Strong Voices Shape our Biofuels Future," a lunchtime panel at the BioEnergy Symposium.

On March 14th a new article on the Free-Air Carbon Dioxide Enrichment (FACE) Experiment, "Frank Munger: CO₂ experiment over, but results still coming in" appeared in the *News Sentinel*. Read it online at <http://www.knoxnews.com/news/2012/mar/14/frank-munger-co2-experiment-over-but-results-in/>.

Also on March 14th the Environmental Sciences Division (ESD) Awards were held. They were awarded as follows:

- Admin of the Year: Tara Hall, For her exemplary support, proactively anticipating needs before they arise, and her enthusiastic efforts to assist wherever needed.
- Outstanding research support: Kenneth Lowe, for his exemplary field, laboratory skills and sustained critical research support. His work has contributed to the success of the Integrated Field Research Challenge and many other scientifically diverse projects.
- Post-Grad researcher: Xiaojuan Yang, for her creative research using pedology theory, data synthesis, and simulation to further our understanding of the global biogeochemistry of phosphorus in soil.
- Stanley I. Auerbach award: Gbadebo Oladosu, for sustained excellence using Computable General Equilibrium modeling to understand how economic activity responds to environmental and market shocks and shifts.

On March 14th Matt Langholtz joined a conference call of the Field Testing Task Force of the Council on Sustainable Biomass Production.

As a co-supervisor for the UBC doctoral candidate Wendi Guo, Shahab Sokhansanj participated in reviewing the student's research progress on March 14th. Wendi's research topic is "Self-Heating and Spontaneous Combustion of Wood Pellets during Storage."

On March 14th and 16th Shahab Sokhansanj meeting with representatives from Vattenfall to discuss potential collaborative research and development (R&D) on biomass torrefaction, pelletization, and logistics. Vattenfall is one of Europe's largest generators of electricity and the largest producer of heat. In electricity and heat Vattenfall works in all parts of the value chain: generation, distribution and sales. The Group has slightly more than 38,000 employees. Vattenfall was represented by researchers Nader Padban and Nicklaus Simonsson, and by business development officers Peter Nilsson, Erik Westerberg, and Bill Sinclair. The meetings led to the development of a list of R&D topics of mutual interests. Further meetings to develop action pathways are planned.

Suresh K. SanthanaVannan participated in the coherent web Developer Resources Advisor Group (DRAG) telecon, March 15th.

On March 16th the Council on Accreditation of the Association for Assessment and Accreditation of Laboratory Animal Care (AAALAC International) indicated that they have elected to continue ORNL's Full Accreditation.

On March 18th ORNL submitted comments on working draft "ISO 13065- Sustainable Criteria for Bioenergy." ORNL also participated in technical exchanges to discuss and develop related documents: U.S. comments on the Working Group 4 (WG4) Report on Indirect Effects, U.S. Talking Points for the ISO meeting, and the WG4 Presentation to the Project Committee.

During March 18th-24th Bob Cook attended the DOE workshop on Experiment-Model Integration in Silver Springs, MD.

On March 19th the article "Mercury mercury everywhere –not just at Y-12" appeared in the *News Sentinel* and included a quote from Mark Peterson. Read the article online at <http://blogs.knoxnews.com/munger/2012/03/mercury-mercury-everywhere---.html>.

Shahab Sokhansanj organized a mini symposium on "The science of torrefaction and pelletization." The event was held at UBC on March 19th. The speakers and titles in this mini symposium were:

- Tony Sauder, "Fiber quantity, quality, and sustainability for bioenergy;"
- Tony Bi, Jack Saddler and Shahab Sokhansanj, "Update on advanced research on solid biofuels: pelletization, thermochemical conversion (torrefaction) and liquid fuels (bioconversion);"
- Staffan Melin, "Design of logistics for regular and torrefied pellets (storage, transport);"
- Fernando Preto, "Pellet as a feedstock for combined heat and power applications."

About 60 people mostly from industry participated in the mini symposium.

On March 20th Debo Oladosu, Maggie Davis and Keith Kline participated in a conference call with researchers from Brazil's Bioethanol Science and Technology Laboratory (CTBE) and the Institute for International Trade Negotiations (ICONE) to continue exchanges that support research to improve land-use change (LUC) modeling by considering mechanisms to allow ORNL's global trade and analysis project dynamic energy policy simulations (GTAP-DEPS) global model and the Brazilian Land-Use Model (BLUM) to interact when simulating effects of biofuel policies.

Tammy Beaty and Jim Lay attended an Earth Science Data and Information System (ESDIS)

Outreach Planning telecon on Wednesday, March 21st to discuss OneData preparations and potential in-booth workshop activities.

ORNL Distributed Active Archive Center (DAAC) member Jerry Pan gave a presentation at the Boulder Earth and Space Science Informatics Group's March 2012 monthly meeting on March 21st in Boulder, CO., titled "Geoscience Data Repository in Digital Object Model and Open-Source Frameworks: Provenance Applications (ESDORA Project)."

During March 21th-22nd Ranjeet Devarakonda and Jerry Pan attended the DEVNEXUS 2012 Conference in Atlanta, GA.

Shahab Sokhansanj gave the webinar presentation "Integrated Biomass Supply Analysis & Logistics." The webinar was presented to the Feedstock Logistics Critical Team at OBP DOE. The presentation was made during two successive one-hour sessions on March 21st and March 28th.

Wellington Muchero presented a talk titled "Genome Scale Discovery of Cell Wall Biosynthesis Genes in Populus" at the Joint Genome Institute user meeting in Walnut Creek, CA, on March 22nd.

A logistics team made up of researchers from ORNL and Idaho National Laboratory (INL) hold a weekly teleconference to discuss their progress on modeling five DOE funded logistics projects. Kevin Kenney (INL), Erin Webb and Shahab Sokhansanj (ORNL), Sam Tagore of Office of Biomass program (DOE) and on occasions Steve Thomas (DOE Office – Golden) participate in this joint effort. The plan is to complete the modeling and analysis of three herbaceous projects (Genera/Tennera, Agco, FDC Enterprises) in 2012 and two woody biomass projects (Auburn, State University of New York [SUNY]) in 2013.

Terry Hazen's article, "Oil Biodegradation and Bioremediation: A Tale of the Two Worst Spills in U.S. History" (coauthored by Ronald M. Atlas) has been selected by *Environmental Science & Technology* as its Best Feature of 2011. Read the original article online at <http://pubs.acs.org/doi/abs/10.1021/es2013227>.

Tommy Phelps presented a talk entitled "Use of Tracers to Evaluate Fate and Transport of Injected Fluids in a session on the Safe Disposal of Saline Fluids in Subsurface Brine Reservoirs" at the 3rd Annual Parsons Brinckerhoff Energy Storage Services- Subsurface Industry Roundtable on March 23rd at the Omni Hotel Houston, TX.

Baohua Gu presented an invited talk at the 243rd American Chemical Society National Meeting & Exposition on "Dual functional role of naturally dissolved organic matter (DOM) in redox transformation of contaminant metals and radionuclides (Hg, U, and Tc)," March 25th-28th, San Diego, CA.

Bob Andres attended the Planet Under Pressure 2012 conference in London, United Kingdom, during March 25th-29th. He presented the poster, "Carbon Dioxide Emissions from Fossil Fuel Consumption: Trends, Growth Rates, and Uncertainty."

On March 26th the article “Can ORNL's White Oak Creek be a testbed for mercury problems at Y-12 and East Fork Poplar Creek?” appeared in the *News Sentinel* and featured Teresa Mathews. Read the article online at <http://blogs.knoxnews.com/munger/2012/03/can-ornls-white-oak-creek-be-a.html>.

At the request of The DOE Office of Energy Efficiency and Renewable Energy (EERE) on March 26th, Rebecca Efroymsen reviewed a bioenergy sustainability proposal for the U.S.-Egypt Joint Science and Technology Fund, a bilateral program that pairs U.S. and Egyptian researchers.

On March 28th Esther Parish presented her research on “Projecting Continental U.S. Water Stress Based on Global Datasets” at the American Water Resources Association (AWRA) 2012 Spring Specialty Conference on Geographic Information System (GIS) and Water Resources VII, "Managing Climate Change Impacts on Water Resources: Adaptation Issues, Options and Strategies" in New Orleans, LA.

Also on March 28th Erin Webb was notified that she had been appointed as an adjunct faculty member of the University of Tennessee Biosystems Engineering and Soil Science Department. Learn more about this department at <http://bioenr.ag.utk.edu/students/>.

Based on comments from Paul Leiby, Tim Theiss, Debo Oladosu and Keith Kline, on March 29th Virginia Dale and Aaron Crowell discussed the April 24th workshop on “Social aspects of bioenergy sustainability” planned by DOE.

Also on March 29th Keith Kline and Virginia Dale joined a conference call of the Council on Sustainable Biomass Production’s Climate Change/Greenhouse Gas task force.

Baohua Gu visited and presented an invited talk at the Environmental Molecular Science Laboratory (EMSL), Pacific Northwest National Laboratory, on "Organo-Mineral Interaction on the Adsorption Hysteresis, Transport and Vulnerability of Soil Organic Carbon," during March 29th-30th, Richland, WA.

Aloke Kumar has been selected as an editorial board member of the *Journal of Biosensors and Bioelectronics* due to his work in this area of microfluidics. Learn more about the editorial board of the *Journal* at <http://www.omicsonline.org/EditorialboardJBSBE.php>.

On March 30th ORNL and partners in Latin America contributed to the development of a proposal for "A Pan American Biofuels and Bioenergy Sustainability Research Network (SRN)." The proposal, led by Michigan Technological University, was submitted to the National Science Foundation Sustainable Research Network Program.

BESD New Arrivals

Harold Shanafield, III, reported to work in March, working in Environmental Informatics with Raymond McCord in the ESD Environmental Data Science & Systems group.