

BIOSPHERIC SCIENCES BRANCH HIGHLIGHTS
January – February 2011

Missions:

The DESDynI Lidar project presented the results of the recent and successful MCR to the Goddard Center Management Council. The council affirmed that the project was ready to proceed to the next step: Key Decision Point A (KDPA). Contact Jon Ranson, Code 614.4, 4-6650, kenneth.j.ranson@nasa.gov

Meetings

North American Carbon Program, New Orleans February 1-4, 2011

NASA's Carbon Cycle & Ecosystems Office, which is hosted by Code 614.4, provides scientific and program coordination to the North American Carbon Program (NACP), an interagency research effort that is a core element of the US Global Change Research Program. Code 614.4 scientists and support staff played key roles in the organization and the scientific content of the NACP 3rd All Investigators Meeting, held in New Orleans, LA, February 1-4, 2011. The meeting attracted scientists interested in the carbon cycle of North America & adjacent coastal waters; government managers associated with US, Canadian and Mexican Carbon Programs; and social scientists, policy makers, stakeholders, and others seeking to improve the scientific basis of decision making.

Program committee members from Code 614.4 included Peter Griffith [Sigma Space Corporation], who serves as the NACP Coordinator; and Carla Evans [Sigma Space Corporation]. Paula Bontempi and Diane Wickland, both Program Managers at NASA HQ, were the other NASA members of the committee. Jim Collatz (614.4) and Jeff Masek (614.4) co-authored a plenary talk entitled "Current Estimates of the US Forest Carbon Sink: Inferring Magnitudes and Mechanisms from Inventories, Flux Measurements, Atmospheric Inversions, Remote Sensing, and Bottom-Up Modeling." Peter Griffith (Sigma Space Corporation) co-authored a plenary talk on "The North American Carbon Program (NACP) Coastal Interim Synthesis Activity: Carbon and Nutrient Exchanges and Transformations at the Land-Ocean Continuum." Scientists from Code 614.4 also co-authored 12 poster presentations on topics ranging from remote sensing methods to estimate forest biomass to modeling forest carbon emissions from logging, fires, and hurricanes. Abstracts, presentations, and videos may be found at http://nacarbon.org/meeting_2011/index.htm Contact Peter Griffith, NASA Carbon Cycle & Ecosystems Office, 4-6610, peter.c.griffith@nasa.gov

Carbon Monitoring System, New Orleans February 3, 2011

Drs. Jeff Masek, Forrest Hall, Ross Nelson, and Chris Neigh (Code 614.4) met with counterparts from JPL, Ames, NASA HQ, Colorado State University, University of Maryland, and the US Forest Service to review progress on the NASA Carbon Monitoring System Biomass pilot project. A major goal was to support collaboration between national biomass mapping occurring at JPL/ARC and local mapping occurring at GSFC, and to establish specific tasks for the rest of the calendar year. Contact Jeff Masek, Code 614.4, 4-6629, jeffrey.g.masek@nasa.gov

Planning Retreat, Osprey Point, February 9-11, 2011

Scientists from the Biospheric Science Branch (614.4) and Terrestrial Information Systems Branch (614.5) met with colleagues from the Department of Geography at the University of Maryland, College Park at the Osprey Point Retreat & Conference Center in Rock Hall, MD on February 9-11th. The goal of the retreat was to improve communication and collaboration among researchers at the two institutions around areas of shared research interests. Contact Jon Ranson, Code 614.4, Code 614.4, 4-6650, Kenneth.J.Ranson@nasa.gov

NACP Talks

NACP Plenary Talks:

Plenary talks were selected through a competitive process by the program committee and were required to be synthetic and cross-cutting in approach:

*Current Estimates of the US Forest Carbon Sink: Inferring Magnitudes and Mechanisms from Inventories, Flux Measurements, Atmospheric Inversions, Remote Sensing, and Bottom-Up Modeling -- (Christopher A Williams, **G. James Collatz**, **Jeffrey G Masek**, Andrew R Jacobson, Linda S Heath, Samuel N Goward, Warren Cohen, Richard A Houghton)*

*The North American Carbon Program (NACP) Coastal Interim Synthesis Activity: Carbon and Nutrient Exchanges and Transformations at the Land-Ocean Continuum -- (Simone Alin, Heather Benway, Wei-jun Cai, Paula Coble, **Peter Griffith**, Steven Lohrenz, Jeremy Mathis, Galen McKinley, Raymond Najjar)*

NACP Posters:

*A multi-sensor approach to constrain long-term forest NPP decline dynamics in North America -- (**Christopher S. Neigh**, **George James Collatz**, Douglas K Bolton, Jennifer J Williams, Mouhamad Diabate, Compton Tucker)*

Modeling the impacts of major forest disturbances on the Earth's coupled carbon-climate system, and the capacity of forests to meet future demands for wood,

fuel, and fiber -- (George C. Hurtt, Ben Bond-Lamberty, Jeffrey Q. Chambers, Louise A Chini, **George James Collatz**, Ralph Dubayah, Jae Edmonds, Steve Frolking, Anthony Janetos, **Doug Morton**, Michael Palace, Allison Thomson, Elena Shevliakova, Peter Thornton, Justin Fisk)

Detection and Attribution of Rapid Large-scale Shifts in the Carbon Balance of North American Ecosystems -- (Wolfgang Buermann, David Medvigy, **George James Collatz**, Claudie Beaulieu, Jorge L. Sarmiento)

Using Landsat Vegetation Change Product, GLAS and ED to investigate the Role of regional forest disturbance and recovery dynamics on the carbon cycle -- (Katelyn Dolan, George C. Hurtt, Chengquan Huang, **Jeff Masek**, Justin Fisk, Ralph Dubayah)

Remote estimation of crop gross primary productivity: from close range to satellites -- (Anatoly A. Gitelson, Yi Peng, Toshihiro Sakamoto, Galina P Keydan, Donald Rundquist, **Jeff Masek**, Shashi B. Verma, Andrew E. Suyker)

Trends and Patterns of US Forest Disturbance from the Landsat Observation Record: Results from the North American Forest Dynamics Project -- (Samuel N. Goward, Robert E Kennedy, **Jeff Masek**, Warren B. Cohen, Gretchen Moisen, Chengquan Huang, Nancy Thomas, Karen Grace Schleeweis)

Tracking Forest Biomass Dynamics Using A Landsat-Lidar Fusion Approach -- (Chengquan Huang, Ralph Dubayah, George Hurtt, Samuel N. Goward, **Jeff Masek**, Zhiliang Zhu)

Recent Rates of Forest Harvest and Conversion in North America -- (**Jeff Masek**, Warren B. Cohen, Don Leckie, Mike Wulder, Rodrigo Vargas, Bernardus de Jong, Sean P Healey, Beverly E. Law, Richard A. Houghton, Richard Birdsey, David J Mildrexler, Samuel N. Goward, Werner Kurz, Brad Smith)

A Small-Sat Mission Concept to Enhance Global Temporal Repeat Coverage at Landsat-Like Resolution -- (Darrel L Williams, Compton J Tucker, **Jeff Masek**, **Molly Brown**, Celeste Jarvis)

Using ICESat-GLAS to Estimate Aboveground Carbon Stocks and Their Uncertainties for the North American Boreal Forest -- (Hank A Margolis, **Ross F Nelson**)

EO-1 Hyperion capturing seasonal dynamics in vegetation phenology and spectral properties corresponding to CO₂ uptake -- (**Petya K.E. Campbell**, **Elizabeth M. Middleton**, David Lagomasino, **Bruce Cook**, **Karl F. Huemmrich**, **David Landis**, Lawrence Corp, Yen-Ben Cheng, **Qing Yuan Zhang**)

Optical sensing of temporal and spatial patterns of gross ecosystem production in a cornfield -- (Karl Fred Huemmrich, Elizabeth M. Middleton, Lawrence Corp, Yen-Ben Cheng, Petya K.E. Campbell, Qingyuan Zhang, Andrew Russ, William Kustas, John Prueger)

Presentations

Dr. Douglas Morton (614.4) presented “NASA Activities in Carbon Measurement, Monitoring, and Research” to the technical working group for SilvaCarbon, a US contribution to the intergovernmental Group on Earth Observations (GEO) Forest Carbon Tracking task. Dr. Morton’s talk emphasized the importance of NASA’s satellite and airborne remote sensing assets, in combination with NASA scientists’ technical expertise, for estimating vegetation carbon stocks and monitoring deforestation and forest degradation. For more information, contact Douglas Morton, Code 614.4, 4-6688, douglas.morton@nasa.gov

Dr. Lahouari Bounoua (614.4) traveled to Algeria as an invited speaker to attend the Second International Colloquium on Biodiversity and Coastal Ecosystems organized by the University of Oran (Algeria) jointly with the University of Nantes (France), 28-30 November 2010. Dr. Bounoua’s talk described the use of satellite data in global climate models and the role of vegetation in mitigating the greenhouse warming, with implications to local climate. For more information contact Dr. Lahouari Bounoua, Code 614.4, Lahouari.Bounoua@nasa.gov

Dr. Douglas Morton (614.4) was invited to present his research on “Remote Sensing for REDD+: Mapping and Monitoring Tropical Forest Carbon Stocks” at the International Society of Tropical Foresters Conference at Yale University January 27-29th. The meeting brought together leading policymakers, scientists, and non-governmental organizations to discuss Communities, Commodities, and Carbon in the context of tropical forest management. Audio recording of individual presentations will be made available through the Yale School of Forestry & Environmental studies. For more information, contact Douglas Morton, Code 614.4, 4-6688, douglas.morton@nasa.gov

Publications:

Dr Lahouari Bounoua (614.4) led a team of scientists from NASA GSFC code 614.4, NASA Johnson Space Center, and the National Oceanic and Atmospheric Administration on a study quantifying the negative feedback of vegetation to greenhouse warming. The modeling study found that under conditions of doubled atmospheric CO₂, additional growth of plants and trees would create a new negative feedback – a cooling effect – in the Earth’s climate system that could work to slow future global warming. The group stresses that while the model’s results showed a negative feedback, it is not a strong enough response to alter the global warming trend that is expected. The study was published in

the journal Geophysical Research Letters on Dec. 7, 2010. The paper was among the GRL's most popular articles during the week of its publication (12/7/10) and among the most read during the week of 01/10/11. The paper was highlighted in Nature magazine on 12/02/10 and on 01/26/11 and on Nature Climate Change on the 01/11/11 as well as many national and international media outlets including a video on Youtube
<http://www.youtube.com/watch?v=l3vIWD4tAHc>. For more information contact Dr. Lahouari Bounoua, Code 614.4, Lahouari.Bounoua@nasa.gov
Bounoua, L. F.G. Hall, P. J. Sellers, A. Kumar, G.J Collatz, C.J. Tucker and M. L. Imhoff: Quantifying the negative feedback of vegetation to greenhouse warming: A modeling approach. *Geophys. Res. Lett.* **37**, L23701-1–L23701-5 (2010).

Dr. Molly Brown (614.4) was highlighted in a USDA article in Agricultural Research Magazine this week regarding her work with the Baltimore Washington Partnership for Forest Stewardship (BWPFS). The article, which can be found at <http://www.ars.usda.gov/is/AR/archive/feb11/forests0211.htm> focuses on BWPFS role in protecting the Chesapeake Bay. For more information contact Dr. Molly Brown, Code 614.4, Molly.Brown@nasa.gov

Education and Public Outreach

Lola Fatoyinbo (614.4) participated in a Digital Learning Network Event with students and educators from around the country in recognition of African American History Month and Engineers Week. The event was hosted by the Office of Education and featured several African American engineers and scientists from Goddard. Dr. Fatoyinbo participated in the live talk show that was webcast for students and educators (grades 5-8) on Feb. 16th. The event highlighted how science, technology, engineering, and mathematics are used every day at Goddard. Goddard scientists and engineers also shared insights into what sparked their career choices. For more information, contact: Dr. Lola Fatoyinbo, Code 614.4, Temilola.e.fatoyinbo@nasa.gov.