EERD Quarterly Report

Project Title: Observing carbon fluxes and potential climate change impacts from forest land management

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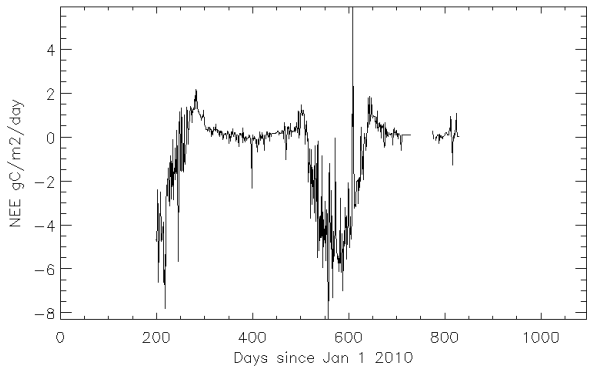
Period: Jan 1,2012-March 31,2012 (2012 Q1)

Project Period: June 1,2010 – May 31, 2013

Overview:
The carbon sequestration capacity of Wisconin's forests is a major natural asset in the state and how property owners manage these forests can impact this capacity. Our study is intensively measuring and modeling carbon sequestration in a north temperature hardwood forest as it undergoes a forest harvest to better predict how future management actions will influence forest carbon cycling.

Activities for Q1:
We have continued to operate and maintain the Willow Creek Ameriflux tower. Despite challenges in running the site and ongoing power and computer failures which we addressed this winter, we have produced long-term data on carbon sequestration in the hardwood forest.

The figure below shows preliminary pre-harvest net ecosystem exchange of CO2 measured over the project period up until April 2012. To date, fluxes at this site show a remarkable level of large carbon sequestration in mature northern hardwood forests, continuing the long-term trend observed in prior years. The particularly warm March 2012, on initial glance, did not appear to have a significant influence on net carbon fluxes, though this may be from the counterbalancing effect of enhanced soil respiration and photosynthesis on leaf budburst.



We have made plans for spring installation of the web camera and summer re-sampling of soil respiration with DOE Lawrence Livermore National Laboratory.

A workshop on forest management impacts to carbon sequestration capacity is being organized by the PI and Erica Smithwick at Penn State University. This will be held on June 27-July 1, 2012 in Woodruff, WI. Nineteen registrants will attend, visit the field site, and form discussion groups on best approaches to handling of land management in carbon cycle models. Workshop information at: http://flux.aos.wisc.edu/twiki/bin/view/Main/ChEASMeeting2012

Our proposal to Dept of Energy was declined for funding, owing to a < 7% funding success rate. We continue to look for new avenues for continued research funding.

A new post-doctoral scholar, Dong Hua, has begun on this process to focus squarely on the modeling aims of the project.

- Relevant publications:
    - Niu, S., et al. (64 co-authors including **Desai, A.R.**), 2012. Thermal optimality of net ecosystem exchange of carbon dioxide and underlying mechanisms. New Phytologist, 194(3), 775-783, doi:10.1111/j.1469-8137.2012.04095.x.
    - Tang, X., Wang, Z., Liu, D., Song, K., Jia, M., Dong, Z., Munger, J.W., Hollinger, D.Y., Bolstad, P.V., Goldstein, A.H., Desai, A.R., Dragoni, D., and Liu, X., 2012. Estimating the net ecosystem exchange for the major forests in the northern United States by integrating MODIS and AmeriFlux data. Agricultural and Forest Meteorology, 156, 75-84, doi:10.1016/j.agrformet.2012.01.003
    - Gower, S.T., Peckham, S.D., **Desai, A.R.**, Black, T.A., McCaughey , J.H., Margolis, H.A., Dunn, A., Wharton, S., Paw U, K.T., Goulden, M.L., Bond-Laberty, B., Barr, A.G., Magnani, F., and Chen, J., 2012. North American old-growth forests are not carbon sinks. #2012-03-03441, submitted
    - Schaefer, K. et al. (50 co-authors including **Desai, A.R.**), 2012. A model-data comparison of gross primary productivity: Results from the North American Carbon Program Site Synthesis. J. Geophys. Res., #2012JG001960, submitted.