Geophysical Research Abstracts
Vol. 14, EGU2012-4900, 2012
EGU General Assembly 2012
© Author(s) 2012

# Quantifying the impacts of land use change on soil organic carbon losses in tropical peatlands

J. Farmer (1,2), J. Smith (1), P. Smith (1), and R. Matthews (2)

(1) University of Aberdeen, Institute of Biological and Environmental Sciences, School of Biological Sciences, 23 St Machar Drive, Aberdeen, AB24 3UU, Scotland, (2) The James Hutton Institute, Craigiebuckler, Aberdeen, AB15 8QH, Scotland

The challenge of collecting field measurements of soil carbon dioxide ($CO_2$) efflux and soil carbon (C) in tropical peatlands creates an opportunity for the use of SOC models for predicting local and regional impacts of land use and climate change on these soils, offering a way of translating this limited data into tangible results.
Previously, no soil C model existed for use in non-steady state sites such as those found on tropical peats- in particular peat swamp forests which accumulate C, and oil palm plantations which are grown for 20-25 years between re-plantings. A simple, user friendly model has been created for use by scientists, policy makers and plantation managers. This model uses only limited inputs to predict the changes to soil C from land use and climate change.
The model runs on the assumption that plant inputs can be related to yield, and that this can be used to derive the decomposition of SOM. It uses a simple decomposition response to determine the changes to the soil C. The model can run in a basic form if data is very limited, or a more complex form with modifiers for temperature, pH, salinity and soil moisture if this data is available.
Using measured $CO_2$ efflux and soil C values from peat cores, combined with literature values, we demonstrate the efficacy of the model, showing how we have identified and addressed some of the issues related to modelling soil C losses from tropical peat soils under land use change. Key challenges addressed included quantifying the effects of drainage when peat swamp forests are converted to oil palm plantations, and comparing field results between sites because in oil palm plantations the original soil conditions prior to conversion from peat swamp forest were largely unknown.