Geophysical Research Abstracts,
Vol. 11, EGU2009-7410-1, 2009
EGU General Assembly 2009

Modelling trends in soil organic carbon under Mediterranean and Alpine forests using the Century model.

T. Chiti (1), P. Smith (2), D. Dalmonech (1), J. Yeluripati (2), D. Papale (1), and R. Valentini (1)

(1) University of Tuscia, Dept. of Forest Environment and Resources, Italy (tommaso.chiti@unitus.it), (2) School of Biological Sciences, University of Aberdeen, Cruickshank Building, St. Machar Drive, Aberdeen AB24 3UU, UK,

In this work, seven Italian eddy covariance flux sites (Mediterranean and Alpine forests) were used to test the performance of the Century 4.5 model in predicting the dynamics of soil organic carbon (SOC) during the first (2008-2012) and the second (2012-2016) commitment periods of the Kyoto Protocol, and further (2100). As the eddy covariance flux sites have been active for 10 years on average (from 1996-1998), the model was evaluated by comparing the modelled SOC values with those measured at each site. In addition, the model was evaluated by comparing estimates of heterotrophic respiration, that were available for each site, with those provided by the model. Since were not available long term observed values for soil carbon, the short term validation of heterotrophic respiration will give confidence on long term model simulations. Once evaluated, two climate change scenarios (based on the emission scenarios) were examined: A1FI ("world markets-fossil fuel intensive") and B2 ("local sustainability"). In general the model fitted very well with the data measured at each site, providing values that were within the standard error of the measurements. The amount of SOC estimated for the two forthcoming commitment periods was not so different from the actual amount measured in 2008, highlighting the difficulty, given the closeness in time to the present of the commitment periods, of detecting carbon changes by direct measurements. Differences in the total amount of SOC from the actual stock were observed only for a longer observation period (2100). In conclusion, this work shows that models can be effective tools for estimating future changes in SOC amounts as an alternative to direct measurements when short period of time are considered.