Geophysical Research Abstracts
Vol. 12, EGU2010-1240, 2010
EGU General Assembly 2010
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Estimating RothC carbon pools from standard TOC combustion data only

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Knowledge of the soil carbon turnover is essential to predict global climate change impact on terrestrial carbon stocks. For the prediction of carbon turnover and the calculation of carbon dioxide efflux from the soil to the atmosphere various models are available, whereby the RothC model is widely used. The RothC model is based on the turnover of different carbon pools, which are measureable by a certain fractionation scheme. Nevertheless, the fractionation is tedious and cost intensive. Especially, if large scale models (e.g. on regional scales) will be run, carbon pool estimation is nearly impossible by the fractionation technique. Therefore, we analyzed the feasibility of using standard TOC combustion data only for pool size determination. In a first step, we determined the carbon pools according to the procedure proposed by Skjemstad et al. (2004). In a second step, we analyzed the TOC combustion curves from the same probes and finally correlated specific combustion temperatures to individual carbon pools. In a last step, we analyzed the uncertainty of the new procedure using a virtual field experiment modeled with the coupled SOILCO2/RothC model (Hebst et al. 2008).