



## **Mitigation potential to increase soil organic carbon in wheat fields**

Matthias Kuhnert (1), Sarah Buckingham (2), Kairsty Topp (2), Vasilis Myrgeiotis (3), and Pete Smith (1)

(1) University of Aberdeen, Institute of Biological and Environmental Sciences, School of Biological Science, Aberdeen, United Kingdom, (2) Scotland ' s Rural College, King ' s Buildings, West Mains Road, Edinburgh , UK, (3) University of Edingburgh, School of Geoscience, Edingburgh, UK

Management of croplands affects the soil organic carbon content in the soil. Thus, changes in the management might increase the SOC content. However, changes in the management go along with a risk of decreased yield. Therefore, these two aspects needs to be analysed together. Emission factors (EF) are an easy approach to calculate the impact of the changes and they are widely applied in different studies. These emission factors are generic and estimated for actual climatic conditions. The values might vary among countries or for changed climatic conditions. Therefore, this study presents computer simulation based calculations for EF in UK on six croplands (all wheat). The EF are calculated by using simulation results of the biogeochemical models LandscapeDNDC and DAYCENT. The considered management practises included changes in fertilizer amounts, residue management and tillage. Additional, fertilizer plots were tested for manure application instead of mineral fertilizer. The results show varying impacts through the different test sites, but with a general trend of highest SOC increases for changes in residue management (residues left on the field) and manure application. The scale of the impacts is different on the different soil types, with higher impacts of residue management on clayey soils and higher tillage effects on sandy soils. An additional analysis of impacts on yield showed that mitigation options resulted in a greater reduction in yield under a future climate than under the current climate. The calculated EF is not in entirely in agreement with IPCC values, especially for some values for manure and residue management that exceed IPCC values for the UK. The results of the study show that the IPCC values need to be adapted for a country specific analysis. Additionally, the EF might change for future climate conditions, which needs to be considered in future estimates.