Geophysical Research Abstracts
Vol. 13, EGU2011-7703, 2011
EGU General Assembly 2011

Effects of soil moisture content and soil texture on Vis-NIR spectroscopy prediction of key soil properties at field scale

Boyan Kuang (1) and Abdul Mouazen (2)

(1) Department of Environmental Science and technology, Cranfield University,United Kingdom (b.kuang@cranfield.ac.uk),
(2) Department of Environmental Science and technology, Cranfield University,United Kingdom (a.mouazen@cranfield.ac.uk)

Soil moisture content and soil texture are the most important factors influencing the measurement accuracy of soil vis-NIR spectroscopy at different scales. This work reports on the effect of these factors on the prediction performance of calibration models of soil total nitrogen (TN), organic carbon (OC) and moisture content (MC) for in situ measurement at field scale, with measurement carried out in summer 2009 in 5 fields in Silsoe experimental farm, The UK. An AgroSpec fiber type visible and near infrared (Vis-NIR) spectrophotometer (tec5, Germany) was used. The results showed that the measurement accuracy ranged from good to very good (RPD=1.93-2.45) for OC and TN and from very good to excellent (RPD=2.46-3.01) for MC. Furthermore, results confirmed that the texture fractions affect the prediction accuracy of the studied soil properties. While the sand content plays a positive effect on the measurement accuracy, the clay content leads to deterioration of the prediction performance. The highest sand content of 64.98% in Shoeground field has resulted in the highest accuracy (RPD values of 2.45, 2.16 and 3.01 for TN, OC and moisture content, respectively) and the lowest sand content of 14.55% in Copse field has resulted in the lowest accuracy (RPD values of 1.79, 1.91 and 2.5 for TN, OC and moisture content, respectively). In contrast, the highest clay content of 57.61% in Copse field has resulted in the lowest accuracy and vice versa for the lowest clay content (14.09%) in Shoeground field. Regarding the effect of soil moisture contents, it was noticed that the measurement accuracy were improved with dryer soils as compared to more wet soils. It is recommended to carry out in situ measurement of soil properties at dryer soil conditions, while accuracy are expected to increase with increase of sand content and/or decrease in clay content