Geophysical Research Abstracts
Vol. 20, EGU2018-15625-1, 2018
EGU General Assembly 2018

Compromise in the hydrology component of pool based soil models

Joseph Oyesiku-Blakemore (1), Jo Smith (1), Lucile Verrot (1), Josie Geris (1), Mark Hodson (3), Xinhua Peng (2), Ganlin Zhang (2), and Paul Hallett (1)

(1) University of Aberdeen, Aberdeen, United Kingdom, (2) Institute of Soil Science, Chinese Academy of Sciences, Nanjing, People's Republic of China, (3) University of York, York, United Kingdom

Hydrology plays a key role in the soil carbon and nitrogen cycles, both in terms of export and processing. Most pool based soil organic matter models include hydrological mechanisms, but there is a trade-off between the accurate representation of real-world systems and an increased cost in data requirements and processing speed. We present a case study using a soil organic matter model, ECOSSE, with a simplified hydrology which is typical for pool based hydrological models. We explore how well this description of hydrology performs in two different sites by comparing simulations with experimental data. For contrast we also use a popular hydrological model, Hydrus, to simulate the same sites and compare its performance. The performance of Hydrus was superior by varying extents depending on the conditions.
We subsequently explore the effect of the hydrology on the soil carbon and nitrogen turnover within these models. The ECOSSE model was used to simulate soil carbon and nitrogen turnover for the sites. The same was done using an altered version of ECOSSE which incorporated the hydrology descriptions from Hydrus. We compare simulations of the two and highlight differences including a 16% higher carbon dioxide emission when using Hydrus with ECOSSE. We discuss the significance of this and other differences and the value of improving the description of hydrological processes in soil organic matter models.