Geophysical Research Abstracts
Vol. 18, EGU2016-2890-1, 2016
EGU General Assembly 2016


# Changes in Flow and Transport Patterns in Fen Peat as a Result of Soil Degradation

Haojie Liu, Manon Janssen, and Bernd Lennartz
University of Rostock, Faculty of Agricultural and Environmental Sciences, Rostock, Germany (haojieliu01@gmail.com)

The preferential movement of water and transport of substances play an important role in soils and are not yet fully understood especially in degraded peat soils. In this study, we aimed at deducing changes in flow and transport patterns in the course of soil degradation as resulting from peat drainage, using titanium dioxide ($TiO_2$) as a dye tracer. The dye tracer experiments were conducted on columns of eight types of differently degraded peat soils from three sites taken both in vertical and horizontal directions. The titanium dioxide suspension (average particle size of 0.3 $\mu$m; 10 g $l^{-1}$) was applied in a pulse of 40 mm to each soil core. Twenty-four hours after the application of the tracer, cross sections of the soil cores were prepared for photo documentation. In addition, the saturated hydraulic conductivity ($K_s$) was determined. Preferential flow occurred in all investigated peat types. From the stained soil structural elements, we concluded that undecomposed plant remains are the major preferential flow pathways in less degraded peat. For more strongly degraded peat, bio-pores, such as root and earthworm channels, operated as the major transport domain. Results show that $K_s$ and the effective pore network in less degraded peat soils are anisotropic. With increasing peat degradation, the $K_s$ and cross section of effective pore network decreased. The results also indicate a strong positive relationship between $K_s$ and number of macropores as well as pore continuity. Hence, we conclude that changes in flow and transport pathways as well as $K_s$ with an increasing peat degradation are due to the disintegration of the peat forming plant material and decrement of number and continuity of macropores after drainage.