Geophysical Research Abstracts,
Vol. 11, EGU2009-1768, 2009
EGU General Assembly 2009

Flow through macropores of different size classes in blanket peat

J. Holden

University of Leeds, School of Geography, Leeds LS2 9JT, United Kingdom (j.holden@leeds.ac.uk, +44 113 343-3308)

Blanket peats are important source areas for runoff in many northern European headwaters. The upper peat layer (20 cm) is dominant in producing flow in blanket peat catchments. However, little information exists on the relative roles of different size classes of macropore in water movement in this upper peat layer. This study uses tension infiltrometer experiments to assess the role of different size classes of macropores in runoff generation. Infiltration measurements were performed under four surface cover types (bare, Eriophorum, Calluna and Sphagnum-dominated), at four soil depths (0 cm, 5 cm, 10 cm and 20 cm) and at four water tensions (0 cm, -3 cm, -6 cm and –12 cm). Macropore flow was found to be an important pathway for runoff generation. Only 22 % of the flow in the upper 20 cm of peat occurred in pores smaller than 0.25 mm in diameter. The remaining portion of flow was equally divided between those pores between 0.25 mm and 1 mm in diameter those pores greater than 1 mm in diameter. Most of the flow in upland blanket peat was generated from only a small volume of the peat. At the surface around 80 % of flux was generated through only 0.26 % of the peat volume while at 5 cm depth, while percolation rates were an order of magnitude slower than at the surface, 85 % of the flux was generated from only 0.01% of the peat volume. Infiltration and effective porosity both declined by over two orders of magnitude over the top 20 cm of the peat. The variability in flow and effective porosity was found to be similar between different pore size classes.