Geophysical Research Abstracts
Vol. 19, EGU2017-**PREVIEW**, 2017
EGU General Assembly 2017

The spatial variability of water chemistry and DOC in bog pools: the importance of slope position, diurnal turnover and pool type

Joseph Holden (1), Ed Turner (1), Andy Baird (1), Jeannie Beadle (1), Mike Billett (2), Lee Brown (1), Pippa Chapman (1), Kerry Dinsmore (3), Gemma Dooling (1,4), Richard Grayson (1), Catherine Moody (1), and Clare Gee (1)

(1) water@leeds, School of Geography, University of Leeds, Leeds, United Kingdom (j.holden@leeds.ac.uk), (2) Biological and Environmental Sciences, University of Stirling, Stirling, United Kingdom, (3) Centre for Ecology and Hydrology, Edinburgh, United Kingdom, (4) Geography, Exeter University, Exeter, United Kingdom

We have previously shown that marine influence is an important factor controlling regional variability of pool water chemistry in blanket peatlands. Here we examine within-site controls on pool water chemistry. We surveyed natural and artificial (restoration sites) bog pools at blanket peatland sites in northern Scotland and Sweden. DOC, pH, conductivity, dissolved oxygen, temperature, cations, anions and absorbance spectra from 220-750nm were sampled. We sampled changes over time but also conducted intensive spatial surveys within individual pools and between pools on the same sampling days at individual study sites. Artificial pools had significantly greater DOC concentrations and different spectral absorbance characteristics when compared to natural pools at all sites studied. Within-pool variability in water chemistry tended to be small, even for very large pools (∼400 m2), except where pools had a layer of loose, mobile detritus on their beds. In these instances rapid changes took place between the overlying water column and the mobile sediment layer wherein dissolved oxygen concentrations dropped from values of around 12-10 mg/L to values less than 0.5 mg/L over just 2-3 cm of the depth profile. Such strong contrasts were not observed for pools which had a hard peat floor and which lacked a significant detritus layer. Strong diurnal turnover occurred within the pools on summer days, including within small, shallow pools (e.g. < 30 cm deep, 1 m2 area). For many pools on these summer days there was an evening spike in dissolved oxygen concentrations which originated at the surface and was then cycled downwards as the pool surface waters cooled. Slope location was a significant control on several pool water chemistry variables including pH and DOC concentration with accumulation (higher concentrations) in pools that were located further downslope in both natural and artificial pool systems. These processes have important implications for our interpretation of water chemistry and gas flux data from pool systems, how we design our sampling strategies and how we upscale results.