Research in the 'Flow Country' IV: Thinking Big

Thurso, Caithness – March 22-24th 2017

Abstract submission form
Deadline: 24th February 2017

Title: Carbon concentrations and transformations in peatland pools

Poster ☐ or Oral presentation (15 min) YES

Authors:
Chapman, P.J., Turner, T.E., McKenzie, R., Moody, C.S., Dinsmore, K.J., Baird, A.J., Billett, M.F., and Holden, J.

Student contribution*: No

Affiliation and email (corresponding author):
Pippa Chapman, School of Geography, University of Leeds
p.j.chapman@leeds.ac.uk

Abstract (300 words)
Although inland waters have been recognised as important components of the global C cycle, most research has focused on lakes or large river systems. Peatland pools represent a key interface between a C rich terrestrial system and an aquatic system and represent a potential hotspot for organic matter processing. Yet data that enable the extent of this processing to be quantified are sparse. In addition, the number and surface area of pools is increasing due to warming in the arctic and peatland restoration. Here we compare aquatic C concentrations in nearby natural and artificial pool systems monitored at three sites in northern Scotland over a three-year period. We found significant differences in pool water carbon concentrations between pool types with larger dissolved organic carbon (DOC) and dissolved carbon dioxide (CO_2) in artificial pools. The differences were strong for all sites and occurred in all seasons. Importantly, the DOC outflows from natural pools were markedly lower than the DOC flowing into natural pools showing that processes in these pools were transforming and removing the DOC. These effects were not found in the artificial pools. Data on the composition of the DOC (absorbance ratios, specific ultraviolet absorbance) suggested that natural pools tended to have DOC that had been processed, and was older (radiocarbon dating) while the DOC in artificial pools was young and had not undergone much biochemical processing. Dissolved methane (CH_4) concentrations were not significantly different between pool types but the concentrations were always above atmospheric levels with values ~ 200 times atmospheric concentrations not uncommon. Dissolved CO_2 concentrations in the artificial pools were extremely large; typically ~20 times atmospheric levels while those in natural pools were typically only just above atmospheric levels. The pools were strong sources of CH_4 and CO_2 evasion from the peat system. The results from this study are compared to studies in Canada.

Pippa Chapman is Professor in biogeochemistry at the School of Geography, University Leeds. Her research focuses on improving our understanding of how nutrients are transported from soils to surface waters and the atmosphere. She is particularly interested in the impacts of land management, atmospheric deposition and climate change on carbon, nitrogen and phosphorus cycling in peatlands, organo-mineral soils and agricultural soils. She has been at the University of Leeds since 1999, prior to that she was at the James Hutton Institute, Aberdeen, for five years where she held a NERC postdoctoral fellowship.

*There will be an award for the best poster and best oral contribution by students

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