1. Introduction

- Peatlands are important terrestrial carbon stores, with 540 ± 100 Gt C in northern peatlands.
- Stoichiometric approaches have been used to understand carbon cycling through Moor House, an upland blanket bog in the UK. 1,2
- DOM in peatland streams highly oxidised – how does this arise?
- This study assesses how organic matter changes from terrestrial to aquatic systems through a peatland system.

2. Methods

- Study site Moor House National Nature Reserve, Upper Teesdale, UK.
- Upland blanket bog – ombrotrophic peatland.
- Study focussed on zero order stream (OHS - Figure 1).
- Samples of:
  - Vegetation
  - Water
  - Peat (2x 3 m cores)
- Dissolved organic matter (DOM)
- Particulate organic matter (POM)
- DOM & POM stream & soil water
- Analysed for CHNOS content.

3. Dissolved organic matter (DOM)

- Elemental composition & carbon oxidation state of DOM sources (Figure 4).
- Shallow, deep & bulk soil pore water; Cottage Hill Slebe (stream water).
- Compared using analysis of variance (ANOVA).

4. Organic matter composition of peat

- Carbon fluxes in near-surface but increases down core.
- No significant changes down-core for PHNOS.
- Median stoichiometry:
  - Peat: C_{23.5}H_{25.6}N_{4.2}O_{10.5}
  - SPW DOM: C_{23.5}H_{25.6}N_{4.2}O_{10.5}
  - OHS DOM: C_{23.5}H_{25.6}N_{4.2}O_{10.5}

5. Transition of organic matter

- Principal components analysis (PCA) using CHNOS, carbon oxidation state (F_{100}, oxidative ratio (OR)) & degree of uncertainty (uncert).
- Figure 6 shows different end-members based on loadings of particular variables (strongest – PC scores in Table 1).

6. Conclusions

- Stream water DOM is distinct from both terrestrial organic matter and soil water DOM, with significant decreases in CHN content.
- Future analyses include C18 isoproteins, FTIR, radiocarbon dating.
- New samples collected at 10 cm depth in peat and surface runoff to further analyse transfer of DOM and POM from soil to stream.