



The composition and degradability of upland dissolved organic matter

Catherine Moody (1), Fred Worrall (1), and Gareth Clay (2)

(1) University of Durham, Earth Science, Durham, United Kingdom (c.s.moody@durham.ac.uk), (2) University of Manchester, School of Environment, Education and Development, Manchester, United Kingdom

In order to assess controls on the degradability of DOM in stream water, samples of dissolved organic matter (DOM) and particulate organic matter (POM) were collected every month for a period of 24 months from an upland, peat-covered catchment in northern England. Each month the degradability of the DOM was assessed by exposing river water to light for up to 24 hours, and the change in the dissolved organic carbon (DOC) concentration in the water was measured. To provide context for the analysis of DOM and its degradability, samples of peat, vegetation, and litter were also taken from the same catchment and analysed.

The organic matter samples were analysed by several methods including: elemental analysis (CHN and O), bomb calorimetry, thermogravimetric analysis, pyrolysis GC/MS, ICP-OES, stable isotope analysis (^{13}C and ^{15}N) and ^{13}C solid state nuclear magnetic resonance (NMR). The water samples were analysed for pH, conductivity, absorbance at 400nm, anions, cations, particulate organic carbon (POC) and DOC concentrations. River flow conditions and meteorology were also recorded at the site and included in the analysis of the composition and degradability of DOM.

The results of multiple regression models showed that the rates of DOC degradation were affected by the N-alkyl, O-alkyl, aldehyde and aromatic relative intensities, gross heat, OR and C:N. Of these, the N-alkyl relative intensity had the greatest influence, and this in turn was found to be dependent on the rainfall and soil temperature in the week before sampling.