



An annual carbon budget for a dystrophic water supply reservoir

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Reservoirs draining peatland soils frequently contain high levels of Dissolved Organic Carbon (DOC) and Particulate Organic Carbon (POC). This has implications for water treatment and the global carbon cycle. DOC in the water column can be converted into particulate organic carbon (POC) and vice-versa. DOC can also be lost be lost from the water via photo or bio-degradation. Carbon transformations in reservoirs are likely to be more significant than in streams as water here has a longer residence time. Currently the magnitude of these processes in reservoirs is poorly understood.

A carbon budget is presented here for a water supply reservoir (catchment area c. 9 square km) draining an area of heavily eroded peatland in the South Pennines, UK. The reservoir has been monitored at regular intervals since January 2012. A programme of fortnightly water sampling has been combined with storm samples to create DOC and POC discharge relationships applicable throughout the year at different flow conditions. This model is then applied to constantly recorded discharge data to create a series of annual DOC and POC fluxes, representing the inputs and outputs to the reservoir. DOC quality is also discussed through the analysis of UV-Visible spectrophotometry results.

Data collection is ongoing but early analysis shows an annual pattern of DOC with both reservoir input and output sampling sites showing higher DOC over the summer (June-September). Most significantly reservoir DOC outputs are commonly higher than inputs between October and May suggesting DOC is being generated from bed POC sediments.