



Aged Riverine Particulate Organic Carbon in Four UK Catchments

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The riverine transport of particulate organic matter (POM) is a significant flux in the carbon cycle, and affects macronutrients and contaminants. We used radiocarbon to characterise POM at 9 riverine sites of four UK catchments (Avon, Conwy, Dee, Ribble) over a one-year period. High-discharge samples were collected on three or four occasions at each site. Suspended particulate matter (SPM) was obtained by centrifugation, and the samples were analysed for carbon isotopes. Concentrations of SPM and SPM organic carbon (OC) contents were also determined, and were found to have a significant negative correlation. For the 7 rivers draining predominantly rural catchments, PO14C values, expressed as percent modern carbon absolute (pMC), varied little among samplings at each site, and there was no significant difference in the average values among the sites. The overall average PO14C value for the 7 sites of 91.2 pMC corresponded to an average age of 680 14C years, but this value arises from the mixing of differently-aged components, and therefore significant amounts of organic matter older than the average value are present in the samples. Although topsoil erosion is probably the major source of the riverine POM, the average PO14C value is appreciably lower than topsoil values (which are typically 100 pMC). This is most likely explained by inputs of older subsoil OC from bank erosion, or the preferential loss of high-14C topsoil organic matter by mineralisation during riverine transport. The significantly lower average PO14C of samples from the River Calder (76.6 pMC), can be ascribed to components containing little or no radiocarbon, derived either from industrial sources or historical coal mining, and this effect is also seen in the River Ribble, downstream of its confluence with the Calder. At the global scale, the results significantly expand available information for PO14C in rivers draining catchments with low erosion rates.