Terrestrial organic carbon and plant wax biomarker export from Scottish river systems

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A growing body of evidence implys a relationship between the age of biospheric carbon biomarkers exported by river basins and regional climate, specifically temperature and hydrology. In particular, higher plant-derived leaf wax radiocarbon (^{14}C) ages tend to increase with increasing latitude, suggesting that temperature-driven soil carbon turnover and storage times are key determinants on overall biospheric carbon residence times in river basins. Fast soil carbon turnover times in tropical regions result in young carbon ages, whereas old ^{14}C ages are found in high latitudes due to the contribution of substantially aged carbon stored in permafrost soils. The present global plant leaf wax ^{14}C data set includes rivers that span a wide range of latitudinal gradients. However, a key gap between latitude 50° and 60° remains. In order to assess the robustness of the positive correlation between the ^{14}C age of plant leaf waxes and river latitude, samples from Scottish river basins are being studied to bridge this information gap.

We present preliminary results on the distribution of carbon age of bulk particulate organic (POC) as well as dissolved organic and inorganic carbon from eight Scottish catchments. Hydrogen isotope (D/H) and ^{14}C characteristics of terrestrial-derived leaf waxes separated from POC in suspended river sediments are being examined. These results are evaluated in the context of global-scale variations in ^{14}C ages of biospheric carbon in rivers.