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The fate of residual carbon in floodplain sediments, originating from eroding peatlands

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Fluvial systems and their associated sediments have been overlooked as part of global carbon budgets until recently. In the UK, large stores of organic carbon in peatlands are dynamically eroding, with the eventual result being 'off-site' greenhouse gas emissions, which must be incorporated into carbon budgets for management strategies. Evans et al. (2013) concluded peatland fluvial systems are active cyclers of carbon, with 50-90% of particulate organic carbon (POC) exported from peatlands eventually emitted as CO_2. Floodplains, although commonly regarded as zones of carbon storage, have been identified as potential hotspots of carbon cycling in the fluvial system with a key process being decomposition of POC. Only 20% of POC may escape mineralisation on floodplains within a peatland catchment (Evans et al., 2013), but studying the composition of the residual carbon has the potential to add to understanding of the drivers of storage versus mineralisation. In this research we have examined stratigraphic records of carbon cycling by focusing on organic matter preserved in a floodplain environment downstream of the Bleaklow Plateau in the Peak District. An OSL date of 640 +/- 90 years BP and a radiocarbon date of 500-310 cal years BP from the sediment cores collected, together with an assessment of the valley morphology using high resolution LiDAR DEM's, indicate potential interaction of post glacial landslide features with the onset of substantial peat erosion, conditioning the landscape to interrupt the transport of carbon down the fluvial network. Floodplain cores have been correlated on the basis of both visual stratigraphy and geochemistry obtained by Itrax core scanning. This data is supported by targeted gas flux data from boreholes using a Gasclam. We present a rudimentary carbon budget for the floodplain of study.