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Mineralization of dissolved and particulate organic carbon transported from soils into water

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The fate of soil-derived organic carbon (SOC) transported during erosion is a large uncertainty in assessing the impact of soil erosion on aquatic environments and in balancing carbon (C) budgets. In our study we determined C mineralization from particulate (solid) organic C (POC) and dissolved organic C (DOC) translocated from soils into surface water. We used runoff generated during rainfall simulation experiments. Both total runoff C (sum of POC and DOC) and DOC were incubated to measure CO_2 evolution during 28-days experiments. Cumulative CO_2 emissions from runoff accounted for 4.0 – 5.8% of initial runoff C. It was estimated that 3.1 to 5.1% of initial POC was mineralized contributing to 68 – 80% of total C mineralization from runoff. Mineralization of DOC was larger (9 – 39% of initial DOC) and showed a much larger variability than mineralization from solid POC. However, DOC mineralization contributed to 20 – 32% of total C mineralization from runoff only because of the much smaller amounts of DOC than POC. We could confirm a preferential removal of labile C from soils by water erosion. Nevertheless, the majority of this C will contribute to an aquatic C sink. Our results indicated that the base level of C mineralization from translocated C was derived from the solid phase whereas the variability depends largely on DOC.