



Transport of suspended sediment and organic carbon during storm events in a large agricultural catchment, southwest France.

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Intensive agriculture has led to environmental degradation through soil erosion and carbon loss transferred from agricultural land to the stream networks. Suspended sediment transport from the agricultural catchment to the watercourses is responsible for aquatic habitat degradation, reservoir sedimentation, and for transporting sediment associated pollutants (pesticides, nutrient, heavy metals and other toxic substances). Consequently, the temporal transport of suspended sediment (SS), dissolved and particulate organic carbon (DOC and POC) was investigated during 18 months from January 2008 to June 2009 within a large agricultural catchment in southwest France. This study is based on an extensive dataset with high temporal resolution using manual and automatic sampling, especially during 15 flood events. Two main objectives aim at: (i) studying temporal transport in suspended sediment (SS), DOC and POC with factors explaining their dynamics and (ii) analysing the relationships between discharge, SSC, DOC and POC during flood events. The study demonstrates there is a strong variability of SS, POC and DOC during flood events. The SS transport during different seasonal floods varied by event from 513 to 41 750 t; POC transport varied from 12 to 748 t and DOC transport varied from 9 to 218 t. The specific yield of the catchment represents 76 t km⁻² y⁻¹ of sediment, 1.8 t km⁻² y⁻¹ of POC and 0.7 t km⁻² y⁻¹ of DOC, respectively. The POC associated with sediment transport from the catchment accounted for ~2.5% of the total sediment load. Flood duration and flood magnitude are key factors in determining the sediment and organic carbon transport. Statistical analyses revealed strong correlations between total precipitation, flood discharge, total water yield with suspended sediment and organic transport. The relationships of SSC, POC and DOC versus discharge over temporal flood events resulted in different hysteresis patterns which were used to suggest those dissolved and particulate origins. POC for both clockwise and anticlockwise also mostly followed the same patterns of discharge and suspended sediment hysteresis. DOC and discharge relationship were mainly dominated by mixing pattern of clockwise and anticlockwise due to dilution effects of water originating from different sources in the whole catchment.