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SEPAL – a simple GIS-based tool to estimate sediment pathways in lowland catchments

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Abstract. Even though soil loss in the lowlands imposes not as much a restriction on land use and agricultural productivity as in erosion affected mountainous areas, the input of fine sediment into the rivers and streams is a concern due to water quality issues and substrate siltation. Drains, river banks and agricultural fields are the three main sources of fine sediment in lowland regions. For a successful implementation of measures to decrease sediment input a well-founded knowledge of the individual entry pathways is essential. To assess the importance of possible entry pathways, a GIS based methodology (SEPAL) has been established combining the ABAG, a river bank erosion formula and a regression approach to include the contributions of drains. SEPAL has been applied on a study catchment in Northern Germany. The results show that 15% of the sediment input into the river comes from agricultural drains, 71% from river banks and 14% from adjacent fields. A comparison of the results with field-mapping and -sampling shows that the approach is plausible. The calculated total annual sediment input is 616 t yr^{-1} , while the measured suspended sediment load is 636 t yr^{-1} . It can be concluded that the methodology is suitable for estimating sediment entry pathways and annual sediment loads in lowland catchments as a base for modelling projects and further investigations. However, further work is necessary for gaining sound knowledge about uncertainties and especially about the processes forcing sediment input from drains.

Full Article in PDF (PDF, 947 KB)

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