

# **Sediment yield assessment in a lowland catchment using the landscape process model LAPSUS**

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In absence of catchment wide sediment flux measurements for the Dutch-German Vecht river, a numerical modelling approach was used to constrain the relative amount of sediment going through the Vecht and related subcatchments. LAPSUS (Schoorl et al, 2000; 2002) is a grid based run-off model that relies on a combination of geological, soil scientific and land use data, water balances and a Digital Elevation Model as important input data. Per gridcell and per time-step the water balance and total amount of erosion and sedimentation is calculated and serves as additional data for the next model run. Based on a downscaling approach using catchment size-hill slope erosion dependencies (Asselman et al., 2003; Hoffmann et al., 2007), a maximum total amount of 1.5 ton/ha of soil erosion per year was established for the Vecht catchment. Sediment redistribution for the various subcatchments was then calculated using this amount as upper limit.

Results indicate that there is a large difference in sediment redistribution for the 13 subcatchments. The mean erosion per gridcell is largest in the German headwaters of the Vecht. Here a combination of steep slopes and shallow soils on bedrock cause strong run-off induced erosion. In the flat, sandy Dutch part of the Vecht, erosion is much less important. Especially in the entire northern area, where a large peat-covered till plateau is present, erosion is non-existent. The middle reaches of the Vecht show a medium amount of mean erosion. Overall, in the Netherlands three times less erosion is present when compared to Germany.

In the German upper reaches also the highest mean sedimentation rates are found. In addition, the main Vecht channel in Germany receives a significant amount of sediment and probably acts as a temporary sediment trap for the upstream derived sediments. Surprisingly enough, the downstream Dutch part of the Vecht receives only a moderate amount of sediment.

If we look at the erosion-sedimentation balance, we find a negative ratio for all subcatchments, with the strongest negative values again for the German upper reaches. This implies that the Vecht as a whole is an actively degrading river system. These results are of importance to future projects focusing on nature restoration in the Vecht catchment. They give insight where in the catchment the more important sediment sources are located. The results also show that nature restoration in the downstream Dutch part is dependant on the German upper reaches. A strong international collaboration is therefore desirable.

## **References**

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