# Development of a software tool to analyse the effect of soil management scenarios on soil erosion and sediment transport in Flanders

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**Introduction:** It is key for erosion and river sediment management to estimate the effect of erosion control measures (ECMs) on soil loss, deposition rates and incoming river sediment load. Quantifying the effect of ECMs can be done with the help of computer models. The Flemish government is developing an erosion and sediment transport model for Flanders to quantify the effect of different ECM scenarios. In this study, the methodology to develop this model, and the development of scenarios, will be explained. In addition, preliminary results of the scenario analysis will be presented.

**Methods:** An adjusted version of the raster-based WaTEM/SEDEM is used to simulate erosion and sediment transport. The model makes use of the Revised Universal Soil Loss Equation (RUSLE), a multiple flow algorithm and a transport equation to estimate the potential soil loss, the amount of transport and erosion/deposition. For a description of the model we refer to [1] and [2]. A Python code is developed to process the input data available for Flanders. The model runs on a spatial resolution of 20 m, and estimates loads on a yearly basis. The main aim of the use of the Python scripts is to process data layers, process a number of user options and facilitate model runs on the scale of Flanders.

**Results:** In this study two sets of scenarios are defined: a multiyear average scenario (1) and the implementation of a set of ECMs scenario (2). Scenario 1 simulates erosion rates and sediment loads for the current status in Flanders with current implemented erosion control measures. In scenario 2, it is assessed what the effect is of implementing future ECMs. In Figure 1, an example of a comparison of scenario 1 and 2 is shown for Flanders. It shows the effect of implementing a series of planned ECMs for each catchment on the estimated soil loss and sediment load.

**Discussion:** The set-up of a Python wrapper for processing input data of Flanders for the CN-WS model is of major importance for standardising data flows for model development of the CN-WS model. In addition, the definition of standard scenarios facilitates a clear-cut communication for decision makers and other users.

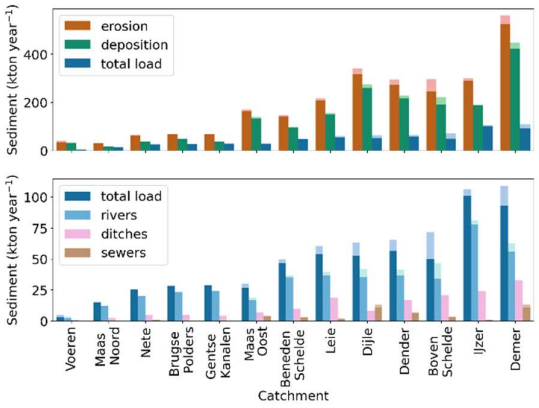


*Figure 1: Comparison sediment load of an ECM scenario (dark colour scale) and multiyear average scenario A (light). The catchments (x-axis) are all administrative catchment in Flanders, sorted according to increasing total sediment load.*

Further steps in the development will focus on making the software more user-friendly, and making available a number of post-processing tools to help users analyse the output of the CN-WS model. In addition, additional information on sewers, ditches and small-scale landscape elements should be collected to further improve the diagnostic analysis of sediment sinks and sources in local areas at interest.

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**References:** [1] Van Oost et al. (2000) Evaluating the effects of changes in landscape structure on soil erosion by water and tillage. *Landscape Ecology* **15**, 577–589. [2] Van Rompaey, et al. (2001) Modelling mean annual sediment yield using a distributed approach. *Earth Surf. Process. Landforms* **26**, 1221–1236.