



Sources of sediment in catchments and its eutrophication potential

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To help the implementation of Water Framework Directive in the Czech Republic the four-year project was set-up to assess eutrophication factors in endangered catchments. The assessed area covers approximately 40% of the area of the Czech Republic (almost 31 500 km²).

The erosion phosphorus loads are modeled by WATEM/SEDEM model adapted for the purpose. For each catchment the sediment transport maps are delivered. Database of 20 477 reservoirs (spatial information taken from DIBAVOD) within CR has been built up during the project and all available information on volumes and flow rates in the reservoirs is collected. From these, 9 890 reservoirs lay in the target area and to estimate the sediment trapping efficiency their volumes and average annual flow rates have to be assessed. The official databases offer less than 10% data coverage so especially for smaller reservoirs the volumes and flow rates have to be derived by analogy using pond area and catchments specific runoff. Brune curves method readjusted by Dendy (1978) is then used for sediment trap efficiency estimation. WATEM/SEDEM model had to be further adapted for modeling phosphorus fluxes within catchments. The ratio of nutrient concentration in eroded sediment to that in the original soil (the enrichment ratio, ER) commonly drops down with raising the soil loss. We used the dependence proposed by Sharpley (1995). The soil erodibility factor of WATEM/SEDEM (K-factor) is then replaced by phosphorus erodibility potential. Finally the erosion phosphorus transport is computed getting also phosphorus retention in all reservoirs in target watersheds. In 2012 sediment transport was modeled in all catchments. Assessment of silting of thousands of reservoirs within the stream network of the target catchments is important “side output” of the project

Balancing phosphorus sources with attempt to find the importance of erosion for eutrophication is a complicated task. The regular monthly monitoring network in streams and reservoirs is an important source of data for balancing phosphorus sources but often misses the episodic erosion inputs. WATEM/SEDEM shows up to be reasonable tool for sediment transport and particulate phosphorus transport within large catchments, even though getting relevant high resolution input data is a limiting factor for assessment. The topography and land-use data are good enough for defining the spatial pattern of erosion and deposition, but for getting actual sediment transport volumes there are not enough data on precipitation, and stream hydrology.

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