Sediment and phosphorus transports within large watersheds - eutrophication potential of soil erosion

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1. REMARK: We model continuously, but how much can be transported during a single event?

**UAV volumetric study 2013**

- 12 ha watershed/field
- April 27 - rainstorm
- Seedbed condition

2000 m³ was in move at single field, 1.7 cm in depth

"USLE" language ➔ 250 t/ha

Tolerable soil loss ➔ 4 t/ha/year

Sediment transported into the pond

Intensification of Agriculture ➔ Soil Erosion

The model estimates may be heavily under/over estimated
Atlas of sediment and phosphorus transport into vulnerable reservoirs within the Czech Republic

- **Summary of the four-year project (QI102A265, 2010 - 2013)** focused on vulnerable stagnant water bodies.
- **Updating of the River Basin Management Plans (WFD).**
- **Catchments of 58 stagnant water bodies** (covering ca 31 500 km²) have been modelled by WATEM/SEDEM coupled with Sharpley eq. (1995).
- **Balancing the P sources** at the inlet to the streams showed that, concerning the total phosphorus content, the soil erosion dominates in most of the catchments. It is not the case for dissolved phosphorus.

Allow the analysis of the importance of individual streams (watersheds) for silting the target tanks.

Provide information on the amount of erosion phosphorus bound to sediment.

Provide detailed information about the source areas of sediment to a single plot level.

Provide information on the speed of silting 10,000 single ponds in assessed watersheds.

Allow the analysis of the importance of individual streams (watersheds) for silting the target tanks.
Interpretation of the results – SEDIMENT BUDGETS

- Sediment trapped in reservoirs (%)
- Sediment trapped in landscape (%)
- Sediment continuing at outlets (%)

- Nové Mlýny (Thaya River)
- Slapy (Moldau River)
Interpretation of the results - RESERVOIRS

Annual % of silting plotted to reservoir volumes (m³)

716 reservoirs (up to 100 000 m³) is silting faster than 1% of a total volume annually.
Interpretation of the results - WATERSHEDS

3rd order catchments: trapped sediment in total & according the reservoir size
Interpretation of the results - EUTROPHICATION

Risk watersheds concerning sediment transport and nutrient loss (Total P)
Risk watersheds concerning eutrophication (dissolved P)
Interpretation of the results – PHOSPHORUS BALANCE

Erosion share within transported particulate or dissolved phosphorus vs. sewage waters
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Thank you for attention!

P.S. Total area of Moldau watershed is just being modelled within 3rd RBMP 😊

Research was conducted and presentation was prepared within projects QK1720289 and QJ1530181 of Ministry of Agriculture of the CR.