

## **On the role of discharge events on nitrogen and phosphorus loads from small tile-drained catchments**

Petr Fučík, Antonín Zajíček, Markéta Kaplická, Jana Peterková, and Renata Duffková

Research Institute for Soil and Water Conservation, Prague, Czech Republic (zajicek.antonin@vumop.cz)

There is a great concern among hydrologists, watershed managers as well as policy makers on how different rainfall-runoff events influence the loss of pollutants from agricultural land. Often, a substantial share of nitrogen (N) and particularly phosphorus (P) loss is reported to happen during discharge events of various magnitude, especially in tile-drained landscapes. We monitored ten small (4 – 35 ha) tile-drained catchments of different land use and agricultural management in Czech Republic for five years (2012 – 2016). Discharge was measured continuously at 10 min interval with ultrasound probes, a regular 14-day scheme of water quality monitoring was accompanied by withdrawal of water samples during discharge events by automatic samplers with 20 – 120 minutes span. For the non-sampled periods, a semi-automated algorithm was developed for selection of discharge events; water quality was set here as the average flow-weighted concentration from a particular site and season. We then quantified the share of discharge events on runoff, N and P loss and further, we compared six different methods for solute load estimation. The results showed considerable differences among the monitored sites and seasons. The share of discharge events on N loads was on average 5 – 30% of the total year load, whereas for P (dissolved and total), the share of discharge events was on average 10 – 80% on the total year load. The most precise method for solute load estimation was apparently the one including the discharge events. The methods based on point monitoring of discharge and water quality underestimated the solute loads of N by 10 – 20%, of P by 30 – 80%. The acquired findings are useful for improvement of nutrient load assessment in tile-drained catchments of various scales as well as for design of diverse mitigation measures on agricultural land or tile drainage systems.