

PROCESS BASED MODELING OF PHOSPHORUS TRANSPORT ON BASIN SCALE

PROZESSBASIERTE MODELLIERUNG DES PHOSPHORTRANSPORTES AUF FLUSSGEBIETSEBENE

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SUMMARY

Prevention of surface waters from nutrient inputs is one of the main goals of the European Water Framework Directive. By applying the model EROSION 3D phosphorus transport is simulated within the Mulde river basin located in the eastern part of Germany.

The meso-scale catchment simulation identifies the Saxon Loess Belt as a hotspot of soil loss and sediment yield. Since particle attached phosphorus transport to surface waters is strongly related to sediment delivery, the streams of the central part of Saxony do suffer from considerable P inputs. Mean sediment losses are 28 t/ha*event for worst-worst-case conditions referring to a 10 years rainfall event and 2.7 t/ha*year for status quo conditions during 2010. Accordingly P-losses amount to 57 kg/ha*event resp. 5.3 kg/ha*year. P-losses can be reduced by up to 8 % if conservation tillage practices are consequently applied to arable land.

Although a comprehensive validation of the model was not intended by this study, simulated P inputs into surface waters are proofed to be valid on micro-catchment and basin scale by comparing with measured event based P discharge.

Keywords: non-point source pollution, sediment yield, particle attached, EU-WFD, process based, EROSION 3D, connectivity

ZUSAMMENFASSUNG

Die Vermeidung von Nährstoffeinträgen in Oberflächenwasser ist eines der Hauptziele der europäischen Wasserrahmenrichtlinie. Unter Anwendung des Modells EROSION 3D wird der Phosphortransport im Einzugsgebiet der Mulde im Osten Deutschlands prozessbasiert simuliert.