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Suspended sediment and phosphorus relations during floods in a small lowland catchment

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The suspended sediment (SS) transport plays an important role in phosphorus cycle in environment. Most of the phosphorus in rivers can be transported during floods events and in association with suspended sediment (Verhoff et all. 1979). It is also known, that sediment can be responsible for 40 to 80 % of total phosphorus (TP) load, especially in agricultural runoff (Ng et.all. 1993). One of the arguments that support these observations, is similarity of pollutographs (Wanielista et al. 1997) of phosphorus and sedimetgraphs (Banasik, Walling 1996). Usually, during floods, the peaks of phosphorus concentration and SS occur before the peak of discharge (Verhoff et.al 1997, Baker 1985). This phenomenon suggested the relation between phosphorus and SS concentrations. Some researchers found that the inverse relations between SS concentration (SSC) and Total Particle Phosphorus (TPP) concentration (Garbrecht, Sharpley 1992, Foster et al. 1996) can be estimated in most cases. However Pionke and Kunishi (1992) do not find statistical significant relations in their investigations. The possible explanation of this phenomenon based on sorption capacity of SS particles. During large runoff events the percentage of coarser particles increases what add to weight of the sediments but relatively decrease phosphorus content compare to finer particles (Garbrecht, Sharpley 1992). In the most cases the power equation (TPP=aSSCb) describe this relation well, however the coefficients a and b of this equation must be found separately for each river.
Suspended sediment (SS), soluble phosphorus (SP), total phosphorus (TP) and total particle phosphorus (TPP) data from storm events has been examined. The investigation has been carried on a small 23.4 km2, lowland, agricultural Zagożdżonka catchment located in central Poland. The peaks of suspended sediment concentration varied from 53.7 mg/l to 16.3 mg/l depend on flood event and in most of cases priori the runoff peak. The SP and TP shows different concentration pattern depend on event, and reach values from 0.18 mgPO4/l to 1.60 mgPO4/l for SP and 0.18 mgP/l to 1.18 mgP/l for TP. The concentration of TPP varied from 1.2 gP/kg sediment to 35.2 gP/kg sediment. The inverse relationship between TPP and SS has been found and the coefficient of the relation has been determined.

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