



Water quality monitoring in a lowland river catchment – joint analysis of the stream, its tributaries and connected eutrophic lakes

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The aim of this study is the assessment of water quality of a stream in a lowland river catchment by considering the impacts of its tributaries and of a connected shallow lake. The investigated mesoscale Kielstau catchment (50 km²) is located in the North German lowlands. Sandy, loamy and peat soils are characteristic for this area. Land use is dominated by agriculture and pasture. A number of small wastewater treatment plants additionally influences the river water quality. Also, the natural water balance has been changed by extensive agricultural drainage systems. The stream Kielstau is 16 km long and flows through the lake Winderatter See (24 ha, mean depth 1.2 m) which is surrounded by nature protection areas. Water samples of the stream, the tributaries and the lake have been analysed in different temporal resolutions for temperature, pH, EC, O₂, NH₄-N, NO₃-N, N_{tot}, PO₄-P, P_{tot}, Cl, SO₄ and BOD₅ since 2005. The results show that the Winderatter See with its potential eutrophic natural condition has an actual hypertrophic condition with an excessively contaminated status (class 7, LAWA 1999). Upstream from the lake, the Kielstau has water quality class III (heavily contaminated, mean of all parameters, LAWA 1998), downstream from the lake class II-III (critically polluted). A high influence on water quality seems to be caused by a fen area in the flood plains downstream from the lake. The tributaries contribute high amounts of nutrients, mainly nitrate and ammonium. It was observed as a tendency that the annual loads were increasing along the river profile of the Kielstau, mainly in the winter.