

Nitrogen losses from a low-intensity agricultural catchment in Galicia (NW Spain): annual and seasonal trend

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Stream water chemistry is tightly coupled to watershed parent geology, soil, chemistry, vegetation processes, atmospheric deposition topography and disturbance and the direct and indirect effects of human activity such as land-use practices, point and diffuse pollution, and changing atmospheric deposition. Human activities have altered natural element cycles which lead to nutrient pollution. Increased altered of nutrients has potentially serious ecological and public health implications. In this regard nitrogen is particularly important.

This paper deals with the dynamics of nitrogen as TKN and nitrate for a period of 5 years. The study was conducted in the Mero River basin located in Galicia, NW Spain. The main activities of the basin are agriculture, livestock and forestry. Water samples were collected both manually and using an automatic sampler at the outlet of the Mero River headwater between October 2005 and September 2010. All collected samples were analysed for TKN, nitrate and suspended solids. Nitrate is the dominant species of nitrogen (TN) in the Mero catchment, accounting for

90% of the TN under baseflow conditions and 60% under runoff events. The NO_3 values are moderately higher than those proposed by Meybeck et al. (1992) as a mean for pristine world waters (0.1 mg L^{-1}) as well as those selected by their uncontaminated nature in NW Spain. In this catchment, in addition to its presence as a natural component, NO_3 is derived from the application of fertilizers, manure and slurries, and their subsequent accumulation in the soil. N-NO_3 and TKN concentrations showed a large seasonal fluctuation, with the lowest values in summer and the highest values from late autumn to late winter. Autumn-winter is rainy season in the study area and favors leaching of nitrate accumulated in the soil during the growing season. The highest N (both N-NO_3 and TKN) concentrations were recorded during runoff events following antecedent wet conditions. The main pathway which led TKN to the sampling point is runoff, while NO_3 is transported mainly in baseflow conditions. A close relationship between TKN and SS concentrations was observed, indicating that both elements are transported together, via surface runoff.

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