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Phosphate oscillation in an agroforestry catchment under atlantic climate

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Excessive organic and inorganic fertilizer application may cause accumulation of phosphorus, which is strongly related to water eutrophication risk. Due to its low mobility, most of the phosphate transfer from soils to water systems is caused by surface runoff. Moreover, phosphate content neither increases nor remains proportional to the flow during flood events. In fact, maximum concentrations are registered at the very beginning of the hydrogram increasing curve. This makes frequent sampling necessary in order to assess precisely the phosphate exports. Phosphate losses from January 1999 to December 2005 in the drainage waters of a 36.3 km^2 agroforestry catchment are estimated in this study. Mass balance was evaluated from phosphorus concentrations measured at the catchment outlet and estimated flow data using a hydrological model, since flow measurements were discontinuous. Hydrological model results were calibrated using continuous measurements, carried out over a two year period, as well as gauging data. Total P ranged from 0.34 to 1.08 kg/ha and dissolved P varied from 0.14 to 0.39 kg/ha depending on the year. Dissolved P concentrations were lower than those of sedimentary P except in 2001. This results were of the same order of magnitude than those found by other authors in the same region and in regions of western Europe. Most exported phosphates come from agricultural land erosion, although the dissolved phosphate component is still significant.