Geophysical Research Abstracts, Vol. 7, 09857, 2005
SRef-ID: 1607-7962/gra/EGU05-A-09857

Pathways of N losses from an agricultural catchment with irrigation in subtropical China

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Non-point source pollution from agriculture is increasingly concerned as a main source for surface water eutrophication. Pathways of nutrient losses have to be identified before taking measures to prevent eutrophication from agriculture. An agricultural catchment in subtropical China, which consisted of irrigated paddy fields and rain-fed arable uplands, was chosen in the this study. N concentration in the surface waters were monitored at the plot, slope, subcatchment and catchment scales. Nutrient budget was estimated according to nutrient inputs and outputs. The objectives of the study were to identify the contributions from different land uses to the nutrient losses at the catchment scale. N concentration and flux at the catchment outlet were variable in season, with greater concentration in late Spring and Summer when stream flows were large and agricultural practices were frequent. Total N concentration at the catchment outlet varied from 0.02 to 2.04 mg l-1ĄCaveraging 0.99 mg l-1. The N output through the catchment outlet was estimated 45.75 kg N ha-1a-1 after subtracting the N input through irrigation water. The N loss accounted for 22.4 % of applied chemical N fertilizers (275 kg N ha-1 a-1 into paddy fields and 200 kg N ha-1 a-1 into uplands). The N loss was twice as much as N input through rainfall. Total N and nitrate concentration measured at upper subcatchment were higher than at catchment outlet, indicating that the upper subcatchment produced higher nutrient export due to higher percentage of upland land uses. The hydrograph at catchment outlet and from a stream at the foot ridge of peanut upland slope within the watershed revealed interflow after heavy rainstorms in the rainy seasons. Correspondingly the contents of total nitrogen and nitrate nitrogen among increased with the flush of interflow after the storms, indicating clay movement from soil after storms. The soil hydrology confirmed the production

of interflow after the storms. The interfolw accounted for 17% of total runoff from the 60.5 mm rainfall on 14 May, 2003 at the watershed scale, and for about 26% for the peanut cropping upland. Total N and nitrate concentration measured in the paddy fields located in upper terrace were lower than in the paddy fields in the lower terrace. These results suggest subsurface flows as important pathway of nutrient loss.