INTEGRATED NITROGEN CATCHMENT MODEL (INCA) APPLIED TO A TROPICAL CATCHMENT ON THE ATLANTIC FOREST, SÃO PAULO, BRAZIL.

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RESUMO

Stream-water flows and the in-stream nitrate and ammonium concentrations in a small (36.7 ha) Atlantic Forest catchment were simulated using the Integrated Nitrogen in CAtchments (INCA) model version 1.9.4. The catchment, at Cunha, is located in the Serra do Mar State Park, SE Brazil, and it is near pristine (the nearest major conurbations are São Paulo and Rio some 450 km distant). However, in the region, development of intensive farming may well occur to increase nitrogen deposition and there are growing pressures for urbanization. The mean-monthly discharges and NO3-N concentration dynamics were adequately simulated for the calibration and validation periods with simulated loss rates of 6.55 $kg.ha^{-1}.yr^{-1}$ for NO3-N and 3.85 $kg.ha^{-1}.yr^{-1}$ for NH4-N. In order to investigate the effects of elevated levels of N deposition in the future, a range of scenarios for atmospheric deposition values were simulated. The highest value corresponds to the levels of deposition found in a highly polluted area of Atlantic Forest in Sao Paulo City. These results showed that for a doubling of the atmospheric deposition generated a 25% increase in the N leaching rate. At levels approaching the São Paulo deposition rate, a factor of five times higher than the current rate, the leaching rate increased by 240%, a level that would have detrimental effects on downstream water quality, creating highly eutrophic conditions. The simulation results indicated that INCA model can be a useful tool to estimate N concentration and fluxes for different atmospheric deposition rates and hydrological conditions.