EFFECTS OF LAND USE ON STABLE CARBON ISOTOPIC COMPOSITION AND CONCENTRATION OF DOC AND DIC IN SOUTHEASTERN US PIEDMONT HEADWATER STREAMS

Roger Burke

U. S. Environmental Protection Agency (USEPA), National Exposure Research Lab (NERL), Ecosystems Research Division, 960 College Station Rd., Athens, GA, 30605, burke.roger@epa.gov.

Stable carbon isotopic composition (delta 13C) and concentrations of DOC and DIC were measured in stream water samples collected monthly in 15 headwater streams from an area with extensive poultry and cattle production and a rapidly growing human population. Linear regression techniques are used to describe the influence of land cover on DOC and DIC delta 13C and concentrations. Results indicate that: (1) mean delta 13C-DOC and mean delta 13C-DIC in study streams range from -28.8 to -27.2 and -17.3 to -12.7 parts-per-thousand, respectively; (2) mean DOC and DIC concentrations range from 1.2 to 5.4 mg/L and from 3.3 to 7.7 mg/L, respectively; (3) watershed pasture land cover best describes (positive correlation) DOC concentration; (4) watershed pasture (positive correlation) and open water (negative correlation) together best describe delta 13C-DOC; (5) watershed open water best describes DIC concentration; and (6) watershed developed land cover (inverse relationship) best describes delta 13C-DIC. Measureable quantities of 13C-enriched DOC, derived either from organic wastes resulting from poultry and cattle production or from C4 pasture grasses, apparently supplement stream DOC pools.