

Temporal Changes in Water Quality of two Karst Springs in Northern Alabama, 1999-2001

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Abstract

Temporal variability of water quality was investigated at two springs in a karst aquifer in northern Alabama from 1999 to 2001. Monthly water samples analyzed for major inorganic constituents from the two springs indicate variability in water quality, both seasonally and in response to storms. Decreases in specific conductance and calcite-saturation indices in samples from the smaller spring within several days of moderate rainfall indicate that spring discharge contains a component of water with short residence times. In contrast, an increase in specific conductance and calcite-saturation indices in samples from the larger spring after heavy rainfall indicate a contribution of water to the spring discharge with relatively long residence times. In samples from both springs, nitrate concentrations vary seasonally in response to an increase in recharge to the aquifer in the fall and early spring. Concentrations in the smaller spring also are affected by short-term dilution following storms. Pesticides and pesticide degradates were detected in all samples collected from the springs, but concentrations generally were low (less than 1 microgram per liter). The herbicides fluometuron, atrazine, and their degradates were the most frequently detected pesticides. Fluometuron concentrations in samples from the smaller spring varied seasonally; however, fluometuron concentrations in samples from the larger spring did not fluctuate appreciably. In both springs, atrazine concentrations were highest after storms in the early spring. Variation of degradate concentrations was similar to the parent compounds.