PARTITIONING METEORIC, SUBSURFACE, AND ANTHROPOGENIC SOURCES OF WATER THAT CONTRIBUTE TO STREAMFLOW GENERATION IN THE PROCTOR CREEK WATERSHED, ATLANTA, GA

Hannah Troast and Luke Pangle

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Streamflow in urban watersheds is characterized by transient, dramatic increases in response to large storm events, and similarly abrupt recessions. Previous research has highlighted the stark differences in the timing and magnitude of streamflow response between urbanized versus non-urbanized watersheds, though notably these differing short-term dynamics may not always lead to differences in overall partitioning of rainfall to streamflow at monthly to annual time scales. Far less is known about the relative contributions to streamflow of water from different sources: specifically, surface runoff from current rainfall, versus groundwater discharge, versus possible leakages from water-supply infrastructure. We are currently developing a study in the Proctor Creek Watershed of Atlanta, GA aimed at elucidating these source contributions to streamflow. We are recording hydrometric measurements of precipitation and streamflow at multiple locations, along with temporally-resolved measurements of stable-isotope ratios and ion concentrations within each of the noted sources. We will utilize these data within 2- and 3-component mixing models in an attempt to evalute relative contributions to flow from each source, and how those contributions vary under differing short-term weather conditions, and longer-term seasonal changes. In this contributed poster we report on our study design and preliminary conclusions drawn from our initial analyses of these data. The overall outcome of this work will be an improved understanding of spatially-variable hydrological processes within the Proctor Creek Basin, and sub-basins, which may also aid in understanding water-quality dynamics within the observed stream channels.

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