Changes in Water Source in Urban Streams as a Response to Storms

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Urban streams are complex and interesting. They are equally as important too because people are living right besides them. Understanding where the water comes from in urban streams is useful because we could learn a lot about pollution dynamics, as well as gauge how effective the stormwater management efforts are in the area. In urban areas, high amounts of rainfall are directed into the streams by manmade impervious surfaces: roads, roofs, storm drains, etc. Because of this, urban streams should mostly consist of “new” rain water, with a smaller percent of “old” pre-event water. However, the data collected from 3 urban streams from a storm in August show that the stormflow may not be primarily from rain water. Samples were collected during 4 storms between August and September using an ISCO autosampler. The samples were filtered, stored, and then analyzed on a Picarro for isotope ratios of hydrogen and oxygen within the water. The proportions of old and new water will be determined through isotope hydrograph separation. Our original hypothesis may not be correct for a few reasons. Our data used a mixture of the event’s rainwater. As storms progress, they generally become isotopically less negative. Collecting multiple rain samples during the storm instead of a collective one could have led to our unexpected data. Using a HYSPLIT model, we can attempt to correct this. Another explanation is that ponds and wetlands need to fill up before they overflow and release water into streams, resulting in a lagged response. If this was possible, it could help to explain our data. Our results have shown that the chemistry and origins of the stream water is more complex than previously thought. Urban streams are important to study because they flow through our towns and by our houses, and a better understanding would improve our neighborhoods.