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Multi-Scale observation of time-variable surface and subsurface interactions of an intermittent urban stream

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Our current understanding of stream-hyporheic tansport is primarily based on field observations conducted during baseflow conditions in perennial streams, with few studies considering time-variable stream-aquifer interactions during storm events. During the summer of 2015, we completed 21 sets of four slug injections prior to, during and after storm events in an urban stream. These data allow for the comparison of temporal heterogeneity in transport processes when the stream was intermittent, or consisting of spatially disconnected pools of water with subsurface flow in between, and when there was continuous surface flow during and after rainfall. The injections were performed in three adjacent 50-meter study reaches, enabling the additional comparison of spatial heterogeneity in transport processes. Reach-scale data demonstrate apparent trends with discharge in both short-term storage (commonly “transient storage”) and long-term storage (commonly “channel water balance”). Preliminary results indicate the interaction of changing advective timescales for tracer studies are an important control on inferred process dynamics. Furthermore, observations of stream connectivity inform time-variable transport processes within intermittent streams. Comparison of short-term and long-term storage at varying discharge demonstrates opportunities and challenges for interpretation of multi-scale solute tracer data along the stream-hyporheic-riparian-floodplain continuum in intermittent streams.