



Statistical analysis of hydrological response in urbanising catchments based on adaptive sampling using inter-amount times

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In this study, we introduced an alternative approach for analysis of hydrological flow time series, using an adaptive sampling framework based on inter-amount times (IATs). The main difference with conventional flow time series is the rate at which low and high flows are sampled: the unit of analysis for IATs is a fixed flow amount, instead of a fixed time window. We analysed statistical distributions of flows and IATs across a wide range of sampling scales to investigate sensitivity of statistical properties such as quantiles, variance, skewness, scaling parameters and flashiness indicators to the sampling scale. We did this based on streamflow time series for 17 (semi)urbanised basins in North Carolina, US, ranging from 13 km² to 238 km² in size. Results showed that adaptive sampling of flow time series based on inter-amounts leads to a more balanced representation of low flow and peak flow values in the statistical distribution. While conventional sampling gives a lot of weight to low flows, as these are most ubiquitous in flow time series, IAT sampling gives relatively more weight to high flow values, when given flow amounts are accumulated in shorter time. As a consequence, IAT sampling gives more information about the tail of the distribution associated with high flows, while conventional sampling gives relatively more information about low flow periods. We will present results of statistical analyses across a range of subdaily to seasonal scales and will highlight some interesting insights that can be derived from IAT statistics with respect to basin flashiness and impact urbanisation on hydrological response.