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Interevent time definition for water quality volume assessment

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The design of an efficient storm water quality control storage in combined sewer systems is still affected by high uncertainty. The main concern is due to the definition of an effective procedure for water quality volume assessment. Basing on the hypothesis of the so called first flush phenomena, many directives and rules enforce to calculate this volume as a constant rainfall depth uniformly distributed all over the catchment surfaces. This method seems to be very simplified, in front of the great complexity of the pollution transport in sewer systems. On the contrary, more sophisticated approaches like water quality model simulation involve high computational costs and require a large amount of data, frequently not available. During these years, probabilistic models have raised in interest because they can relate the water quality volume to the device failure risk in a simpler manner. This approach is based on the calibration of probabilistic distributions of the rainfall event depth and the interevent duration, that derive from the frequency analysis of the complete rainfall time series. In this procedure, the criterion for partitioning the continuous time series into single independent rainfall events plays a key role: different choices could lead to very different water quality volume estimations. Therefore, this work deals with a first evaluation of the sensibility of probabilistic models respect to this aspect.