Investigation of stochastic similarities among influent and treated effluent variables of spatially distributed wastewater treatment plants in Greece; I: Statistical analysis of influent variables in terms of the marginal distribution

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The aim of this research is to identify any statistical similarities among influent variables of spatially distributed wastewater treatment plants. The data is downloaded from the Greek national database of wastewater treatment plants (http://astikalimata.ypeka.gr), where spatial information (location, treated population) is uniformly distributed over Greece. For each plant several influent parameters (i.e. BOD5, COD, SS, T-N, NH4-N, NO_3-N, T-P) are analyzed in terms of their marginal distributions. Specifically, for each variable we estimate its marginal statistics for each season and overall, e.g. probability distribution function and first four classical and L-moments, and we perform statistical methods (e.g. square error and maximum-likelihood) to identify the most appropriate distribution that can adequately simulate the observed variability. Finally, we discuss the spatial distribution of the marginal estimates of the selected variables and whether they exhibit any statistical similarities.