



Optimal infilling of missing values in hydrometeorological time series

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Being a group of undergraduate students in the National Technical University of Athens, attending the course of Stochastic Methods in Water Resources, we study, in cooperation with our tutors, the infilling of missing values of hydrometeorological time series from measurements at neighbouring times. The literature provides a plethora of methods, most of which are reduced to a linear statistical interpolating relationship. Assuming that the underlying hydrometeorological process behaves like either a Markovian or a Hurst-Kolmogorov process we estimate the missing values using two techniques, i.e., (a) a local average (with equal weights) based on the optimal number of measurements referring to a number of forward and backward time steps, and (b) a weighted average using all available data. In each of the cases we determine the unknown quantities (the required number of neighbouring values or the sequence of weights) so as to minimize the estimation mean square error. The results of this investigation are easily applicable for infilling time series in real-world applications.