



Application of stochastic methods for wind speed forecasting and wind turbines design at the area of Thessaly, Greece

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Several methods exist for estimating the statistical properties of wind speed, most of them being deterministic or probabilistic, disregarding though its long-term behaviour. Here, we focus on the stochastic nature of wind. After analyzing several historical timeseries at the area of interest (AoI) in Thessaly (Greece), we show that a Hurst-Kolmogorov (HK) behaviour is apparent. Thus, disregarding the latter could lead to unrealistic predictions and wind load situations, causing some impact on the energy production and management. Moreover, we construct a stochastic model capable of preserving the HK behaviour and we produce synthetic timeseries using a Monte-Carlo approach to estimate the future wind loads in the AoI. Finally, we identify the appropriate types of wind turbines for the AoI (based on the IEC 61400 standards) and propose several industrial solutions.

Acknowledgement: This research is conducted within the frame of the undergraduate course "Stochastic Methods in Water Resources" of the National Technical University of Athens (NTUA). The School of Civil Engineering of NTUA provided moral support for the participation of the students in the Assembly.