



## **Comparison of Artificial Neural Networks and ARIMA statistical models in simulations of target wind time series**

Kostantinos Kolokythas, Salamalikis Vasileios, Argiriou Athanassios, and Andreas Kazantzidis  
Laboratory of Atmospheric Physics, University of Patras, Greece (akaza@upatras.gr)

The wind is a result of complex interactions of numerous mechanisms taking place in small or large scales, so, the better knowledge of its behavior is essential in a variety of applications, especially in the field of power production coming from wind turbines. In the literature there is a considerable number of models, either physical or statistical ones, dealing with the problem of simulation and prediction of wind speed. Among others, Artificial Neural Networks (ANNs) are widely used for the purpose of wind forecasting and, in the great majority of cases, outperform other conventional statistical models.

In this study, a number of ANNs with different architectures, which have been created and applied in a dataset of wind time series, are compared to Auto Regressive Integrated Moving Average (ARIMA) statistical models. The data consist of mean hourly wind speeds coming from a wind farm on a hilly Greek region and cover a period of one year (2013). The main goal is to evaluate the models ability to simulate successfully the wind speed at a significant point (target). Goodness-of-fit statistics are performed for the comparison of the different methods. In general, the ANN showed the best performance in the estimation of wind speed prevailing over the ARIMA models.