STUDY OF TIME SERIES OF AIR POLLUTION IN THE CITY OF KAVALA, GREECE

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EXTENDED ABSTRACT

In this paper, the study of the time series of air pollutant concentration in the city of Kavala (Northeastern Greece) is presented. The air pollutants considered are: ozone (O_3), coal monoxide (CO), nitrogen monoxide (NO), nitrogen dioxide (NO_2) and sulphur dioxide (SO_2).

Hourly data of the concentration of the above mentioned pollutants for the time period 1. March 2000 - 31. August 2000 were available. These data were registered in the measuring station of the Prefecture of Kavala, which is located in the center of the city of Kavala. The main sources of the atmospheric pollution are the motor cars, the installations of central heating in the houses and the industry of phosphoric fertilizers, located near the city of Kavala.

As far as the elaboration of the time series is concerned, an ARIMA (autoregressive integrated moving average) multiplicative model was adapted to the time series of each pollutant in order to forecast the short-term future evolution of the time series. The suitable ARIMA model for each time series was determined by the "try and error" - method. The statistic criteria used for the adaptation of the ARIMA models to the time series are: the Akaike Information Criterion (AIC), the Schwartz Bayesian Criterion (SBC), the standard deviation of the random residuals and the cumulative distribution of the Student variable t'.

Apart from that, the long-term trend of the time series of each pollutant was determined after the subtraction of the seasonality, according to the method CENSUS II-X-11. A polynomial curve of 5th degree was used for the graphical representation of the trend of each time series.

From the present study is concluded that the short-term future evolution of the time series of the air pollutant concentration in the city of Kavala can be approximated satisfactorily by an ARIMA multiplicative model.

Key words: time series, air pollutant, Kavala, ARIMA model, trend, seasonality