Spectral Analysis and Forecast of Ozone over Egypt

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ABSTRACT
In this paper the relationships between total ozone amount and meteorological variables have been deduced for eight stations of Egypt. Residual method has been applied to estimate total ozone values using the meteorological variables. Empirical equations relating the total ozone amount with these variables have been deduced for the eight stations. Very good correlation coefficient between the actual and estimated values of ozone has been found. The obtained good relations make us able to estimate and forecast ozone amount whether there are meteorological stations or not, by using numerical weather prediction models outputs. Spectral analysis of the daily, monthly and annual values of total column ozone data of the eight stations has been examined. It is found that the annual wave is the dominant wave in all stations. This wave simply represents the seasonal variation caused due to meridional circulation. There are five significant dominant waves appear in the annual time series of the most stations, the wave length of these waves are 2.8, 2.6, 4.5, 18 and 9 year respectively. The first and second waves are qualitatively matches the quasi-biennial oscillation. The last wave which has a period of approximately 9 years clearly matches the solar sunspot cycle period, while the wave 4.5 year cycle seem to be associated with the El-Nino Southern Oscillation.