

USING SIMPLE STATISTICS TO MAKE PREDICTIONS ABOUT THE NUMBER AND DURATION OF EXCEEDANCES OF AIR QUALITY THRESHOLDS

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Two important factors that affect human health are the duration of a pollution incident and the peak value reached during the incident. Any technique that allowed predictions to be made with regard to these two facets of air pollution would be useful to those charged with managing air quality, such as local authorities, and those investigating the health effects of pollution. The paper firstly investigates the straightforward estimation of the number of breaches of air pollution standards and either the duration or peak value reached during such breaches in a given period of time. Hourly values of 24 hour running average PM10 data were obtained from a TEOM particle monitor operated by Sefton MBC, UK. The number of exceedances of the National Air Quality Strategy (NAQS) Standard and their duration were then calculated and distributions empirically fitted. It was found that a Weibull Distribution provided the best fit. The distributions obtained were then used to make predictions of the duration or peak value of events when the NAQS Standard was exceeded and the return period of such events. The authors then apply the work of Guigliano et al (1998) to develop empirical models describing the number and duration of events where a specified threshold was exceeded. Guigliano proposed an empirical description of the number of exceedances of a given threshold in terms of the ratio of the threshold to the annual mean value. The attraction of this work is the possibility of deriving the statistics from relatively limited input characteristics.