A STATISTICAL ANALYSIS OF AIR POLLUTION BASED ON EXPECTED NUMBER OF EXCEEDANCES IN JAIPUR CITY

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In order to protect the population from adverse health effect due to pollution many governments choose to set a standard. Such standard usually take the form of some stated upper limit which pollutant level should not exceed. Such standard is called deterministic or ideal standard. An ideal standard describe the overall global situation but ignores the uncertainty and variation to examine compliance with it. In this paper we discuss the air pollution standard based on the expected number of exceedancies and on the basis of these standards we analyze the air pollution level in Jaipur city.

INTRODUCTION

Air pollution pertains to a wide range of contaminants in the atmosphere and clean air is the basic requirement of the life. In spite of introduction of cleaner technologies in the industry, energy, production and transport sector, air pollution remains a major health risk. Recent epidemiological studies have provided evidence that even low pollution levels increase mortality and morbidity. Air quality standards provide a legal framework for air pollution control. Air quality standard is a description of a level of air quality that is adopted by a regulatory authority as enforceable.

An exceedance of a standard is the number of times (which is defined in each standard) when the pollutant concentration is higher than that set down by the standard. In the field of air pollution control, the original National Ambient Air Quality Standards (NAAQS) promulgated in India in 1995 specified an upper limit of ambient pollutant concentration that was "not to be exceeded more than 2% per year" at a given monitoring location.
Thus we can set the air pollution standard in terms of expected number of exceedancies. Note that the use of expected number of exceedancies is desirable from statistical point of view. And following this approach the NAAQS is attained when the expected number of exceedancies per year at a given location is less than or equal to 2 (since there are 100 observations per year per monitoring site).

In this paper we obtain the air pollution standard based on the expected number of exceedances. In section 2, we obtain the distribution of number of exceedances for 1-year and 3-year period. We use the probability distribution of number of exceedances to compute the probability of 3 or more exceedances in a particular year for a particular monitoring site

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