

Status of PM₁₀ as an air pollutant and prediction using meteorological indexes in Shiraz, Iran

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Abstract. In the present study research air quality analyses for PM₁₀, were conducted in Shiraz, a city in the south of Iran. The measurements were taken from 2011 through 2012 in two different locations to prepare average data in the city. The averages concentrations were calculated for every 24 hours, each month and each season. Results showed that the highest concentration of PM₁₀ occurs generally in the night while the least concentration was found at the afternoon. Monthly concentrations of PM₁₀ showed highest value in August, while least value was found in January. The seasonal concentrations showed the least amounts in autumn while the highest amounts in summer. Relations between the air pollutant and some meteorological parameters were calculated statistically using the daily average data. The wind data (velocity, direction), relative humidity, temperature, sunshine periods, evaporation, dew point and rainfall were considered as independent variables. The relationships between concentration of pollutant and meteorological parameters were expressed by multiple linear regression equations for both annual and seasonal conditions SPSS software. RMSE test showed that among different prediction models, stepwise model is the best option.

Keywords: PM₁₀; air pollution; meteorological parameters; regression model

1. Introduction

Air sustains life. But the air we breathe is not pure. It contains a lot of pollutants and most of these pollutants are toxic (Sharma 2001, Fleischer *et al.* 2014, Majidnezhad 2014). While developed countries have been making progress during the last century, air quality has been getting much worse especially in developing countries air pollution exceeds all health standards. For example, in Lahore and Xian (china) Dust is ten times higher than health standards (Sharma 2001).

Particulate Matters (PM) is one of the seven Conventional (criteria) pollutants (including SO₂, CO, particulates, hydrocarbons, nitrogen oxides, O₃ and lead). These pollutants produce the highest volume of pollutants in the air and the most serious threat for human health and welfare (Wang *et al.* 2015, Asghari and Nematzadeh 2016, Khader *et al.* 2016). Concentration on these pollutants, especially in cities, has been regulated by Clean Air Act since 1970 (Cunningham and Cunningham 2002). Particulate pollutants may be classified according to their nature and size as

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