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ASSESSMENT OF EMISSION REDUCTION AND IMPACT FACTORS FOR AIR POLLUTANTS IN JORDAN DURING THE COVID-19 PANDEMIC

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Abstract

The primary objective of this study is to evaluate the impact of traffic, industry and Jordan climate change on the reduction and dispersion of Hydrogen sulfide (H_2S), Sulfur dioxide (SO_2), Nitrogen dioxide (NO_2), Carbon monoxide (CO), and Particulate Matters PM_{10} (particles with aerodynamic diameters < 10 μm) before and after COVID-19 pandemic in Amman, the capital city of Jordan, which has the highest population and traffic densities, and Az Zarqa, an industrial area with 55% of different types of industries. The monthly concentration of air pollutants, temperature, humidity, and wind speed were measured and analyzed in the two cities. Three meteorological maps were generated using QGIS, linear, multiple regression models, and Pearson correlations were developed. Results of the present study reveal that during the COVID-19 pandemic, there was a significant decrease in the concentrations of these air pollutants. This decrease is attributed to the reduction of primary sources of air pollutants, which are linked to the reductions in traffic volume and industrial activities during the lockdown. Furthermore, linear and multiple regression statistical results show that during the COVID-19 pandemic, in Amman traffic was the most influencing factor that positively correlated in the reduction of PM_{10}, CO with r^2 = (+0.73,+0.54), the influencing factor of H_2S and NO_2 was the humidity as r^2=(+0.47,+0.50). Wind speed has a negative correlation with SO_2 reduction with r^2=(-0.42). In Az Zarqa, traffic was the most influencing factor in the reduction of PM_{10} with r^2=+0.62. Humidity has a significant impact on the dispersion of CO with r^2=+0.63, but the influencing factor of H_2S, SO_2, and NO_2 was the industry as r^2=(+0.77,+0.57,0.75). Efforts to reduce traffic-related emissions and manage humidity levels could effectively mitigate PM_{10} and CO as well as H_2S and SO_2 pollution, respectively.

Key words: air pollution, dust storms, industry, particulate matter, vehicle emissions

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