



“Gheorghe Asachi” Technical University of Iasi, Romania



SEASONAL AND SPATIAL ZONING OF AIR QUALITY INDEX AND AMBIENT AIR POLLUTANTS IN AHVAZ OIL AND GAS FACTORIES WITH GEOGRAPHIC INFORMATION SYSTEM

Ali Kashani Saffar¹, Hossein Norouzi¹, Nasrin Choobkar^{1*}, Lia Shoshtari Kermanshahi²

¹Department of Environment, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran

²Department of Biotechnology and Plant Breeding, Kermanshah Branch, Islamic Azad University, Kermanshah, Iran

Abstract

The present study aimed to assess the impact of gas emissions from the oil and gas exploitation complex No. 3, located in the west of Ahvaz, during the summer and winter of 2019. To achieve this goal, gases such as nitrogen dioxide (NO₂), carbon dioxide (CO₂), sulfur dioxide (SO₂), and carbon monoxide (CO) were measured at various distances (50, 100, 500, 1000, 2000, and 3000 m) in the north, south, west, and east directions using direct reading instruments. Subsequently, the air quality index (AQI) was calculated for each distance and direction based on the obtained gas concentrations. The results indicated that during the summer, SO₂, CO, and NO₂ levels reached undesirable to hazardous conditions in 45.83%, 95.83%, 83.33%, and 87.5% of the measured locations, respectively. Additionally, ozone (O₃) resulted in an unhealthy condition for sensitive groups in 16.66% of the points and a healthy and clean condition in 83.34% of the points during the summer. However, during the winter, 86.34% of the points experienced healthy and clean air quality, while 16.66% observed extremely unhealthy conditions due to O₃. Furthermore, PM_{2.5} particles contributed to unhealthy to dangerous air quality in 45.83% of the points during the summer and 20.83% during the winter. Similarly, PM₁₀ particles led to unhealthy to dangerous air quality in 8.33% of the points during both summer and winter. Overall, the Air Quality Index indicated that the west of Ahvaz experienced unhealthy and extremely unhealthy conditions during the summer and winter of 2019. These conditions were attributed to the emissions from complex flares and the intensification of pollution resulting from human activities, particularly vehicle traffic.

Key words: air pollution, air quality index (AQI), oil and gas exploitation, suspended particles

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* Author to whom all correspondence should be addressed: e-mail: nchoobkar20@gmail.com