Global Scientific Journal of Environmental Research 1 (2024)/ 71-76

Contents lists available at www.gsjpublications.com

Global Scientific Journal of Environmental Research

journal homepage: www.gsjpublications.com/gsjer

Esteeming the Nitrogen Dioxide (NO_2) Emission in Tanjaro Region

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ARTICLE INFO

Received: 5 Feb 2024,
Revised: 15 Feb 2024,
Accepted: 17 Feb 2024,
Online: 27 Mar 2024

Keywords:
Tanjaro; Air quality ; NO_2; ISC-AERMOD , Sulaymaniya

ABSTRACT

Study of the experiment measurement and the Pollutant of traffic emissions of Nitrogen dioxide (NO2)quality around the Tanjaro region in Sulaymaniya city in the north of Iraq(Kurdistan), where the Nitrogen dioxide (NO2) conducted experimentally then showed the Pollutant of traffic emissions for Experimental study was performed to measure existing air quality. Numerical study was done to model the extent of pollutant dispersion within and around the factories area. Pollutant measurements were carried out using an air quality mobile laboratory at three points sections. Numerical calculations were made using an ISC-AERMOD dispersion model. Concentrations of traffic emissions including Nitrogen dioxide (NO2)is presented and analyzed. The calculated concentrations are validated by comparing with observed values at the three point sections. The results showed good agreement between evaluated concentrations and measured values, by demonstrating an acceptable model performanc. Results show that the factories area is experiencing high concentrations of NO2. High buildings around the factories area act as flow obstacles. Mean pollutant dispersion was toward the north and northeast factories area in Tanjaro region by using ISC-AERMOD during January were observed highest mean concentrations in the last mentioned month .

1. Introduction

The air quality of Pollutant of traffic emissions of Nitrogen dioxide (NO2) has become more imperative in recent years, which effects on human health. In latest years, many agents have studied pollutant emissions at different positions in world and big consequential foundation of industrial air pollution are the automobiles. These researches show high absorption of atmospheric pollution air. Study of the effect of the traffic emission of the pollution of the air quality in where in this paper AERMOD dispersion model had been used. Comparing made between the traffic emission including, NO2, which the result shows good agreement . Figure 1. Shows air pollution that causes by factories in our plant.

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doi: 10.5281/gsjer.2024.10869345

Figure 1. Air pollution factories in the world.

In this paper AERMOD is the complete and power full air dispersion modeling ,where its popular in USA. Also this model is used extensively to access pollution concentration and deposition from wide coverage area of sources. The AERMOD tools are provided to get the air quality analysis done on time, which including imports variety of base map format, 3D powerful visualization, building analysis. Easy and graphical interface, data metric in units, report ready output, etc……, . Where the AERMOD customizable GIS–Based emission inventory system, where is a dynamic and powerful package that features a unique spatial and temporal GIS based platform , which designed for feudality to state wide to nationwide coverage data are compiled and stored in a complete geospatial data base engine. Dimitrov and etal study in [1] the characteristics of a gasoline engine at 2015. And Maya Stefanova and etal study the Nitrous oxide emission in [2] at 2014 then its reduction in [3][4] at 2015,2016 respectively , and at 2017 she studied in [5] Nitrous oxide emission by using BREEZE AERMOD Software. Where Liao and Chturkova at 2017 in [6,7] respectively they proved that specific rising ground and lowland, which they had acceptable affections for dispersion atmosphere pollutants.R. Zakaria and etal in 2020 at [8] they used AERMOD software model to air dispersion of gas turbine power plant emissions in Makassar region where they used the AERMOD software program.

2. Mythology

In this paper we choose Tanjaro region in Sulaymaniya city in the north of Iraq (Kurdistan region) to study the air pollution factories in the below Region as shown in Figure 2.

Fig.2. Iraq google map

Three point locations were designated at Figure 3. Below Show at the region points of Tanjaro region in Sulaymaniya city in the north of Iraq (Kurdistan region) where the Iraqi Kurdistan or Southern Kurdistan refers to the Kurdish-populated part of northern Iraq. It is considered one of the four parts of "Kurdistan" in Western Asia, which also includes parts of southeastern Turkey, northern Syria, and northwestern Iran[3]. From the Northwest and the other from the Southwest. One is located near the Middle East point selection.

Fig.3. The three Locations around the factories in Tanjaro region.

Location Point (P1) at the Northwest of the factories in Tanjaro region, whereas location point (P3)is at the Southwest from Industrial Dis factories in Tanjaro region , while the location point (P2) is located near the Middle East point selection from the factories in Tanjaro region. Figure 4. Shows the Ideal lattices for factories in Tanjaro region.

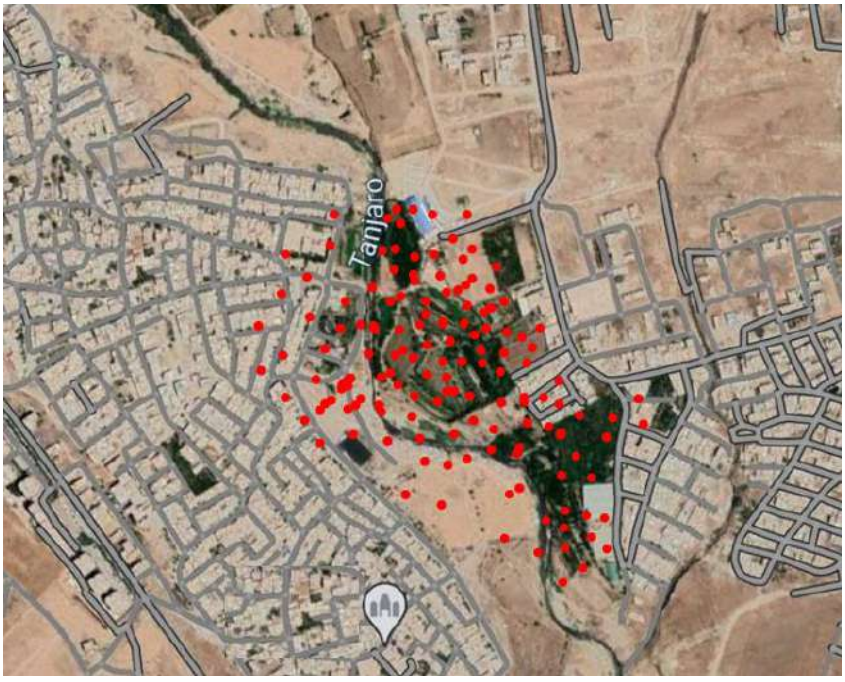

Figure 4. Ideal lattices for factories in Tanjaro region.

Figure 5. Shows Wind statistics for factories in Tanjaro region in may. Witnessing was finished synchronously at all point location during June. In 2022. Atmosphere feature model results

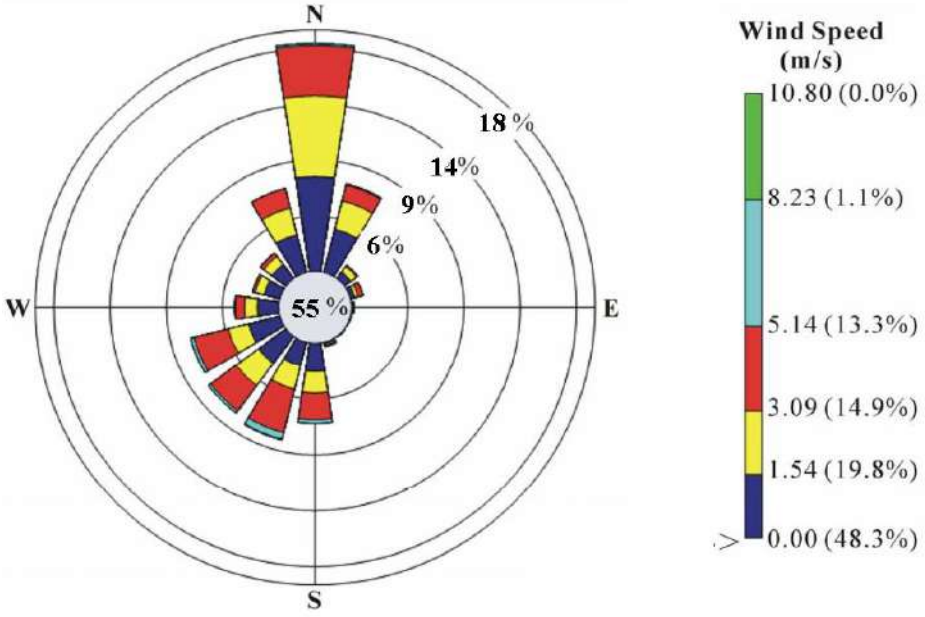

Figure5. Wind statistics for factories in June.

3. Simulation Result

In this paper by using an ISC-AERMOD dispersion model. we choose Tanjaro region in Sulaymaniya city in the north of Iraq (Kurdistan region) to study the air pollution factories in the Region as shown from the above Figure 2 in the mythology section. Iraqi Kurdistan or Southern Kurdistan refers to the Kurdish-populated part of northern Iraq. It is considered one of the four parts of "Kurdistan" in Western Asia, which also includes parts of southeastern Turkey, northern Syria, and northwestern Iran[3]. Table 1. Shows the maximum hourly of pollutant of the positions in the Tanjaro region in the northern in Iraq in the Sulamanyia city (Kurdistan region).

Table 1. The maximum hourly of pollutant of the positions in Tanjaro

Pol.	Period	Maximum			Conservative level
		P1	P2	P3	
NO_2	1 hr	247	162	130	188
	24 hr	113	74	44	150
	1 hr	149	137	102	157
PM_{10}	1 hr	1907	710	-	300
	24 hr	557	426	565	150
$PM_{2.5}$	24 hr	132	139	125	65

Result of the air value were confirmed using 3 handset points (P1),(P2)and P3 near the Tanjaro from the southern of sulaymaniya as shown in figure 1 the location of the last region from google map earth. While in figure2. Indicated the locations of the mobile point in the

industrial district. Where these monitored points for various pollutants during the last three month
as mentioned in previous section and shown at figure1. Stations observed the different pollutants pending the last weeks of June 2022 . Average location point information for different pollutants NO2, PM10,PM2.5 pending June 2022 presented in Table 1.

The (PM10) was measured: Nitrogen dioxide (NO2), and the PM2.5 showed the more absorption from all pollutants. Average NO2 was 247PPM for p1 at the first hour and 162PPM at P2 and 130 PPM at P3 while the conservative level shows 188 PPM for the three point for NO2 pollution PPM at (P2) where it increased in the PM10 more than in (P1), (P2) respectively while disappeared in (P3). At PM2.5 it decreased more than the NO2 and PM10 at the three position (P1) (P2)(P3): Traffic jam, heavy adjustment activities at factories ; and the momentary bus stopping – place close to the zone.Car also van traffic where stable sources of atmosphere pollution in the factories in Tanjaro region Location Point (P1) hourly statistical chart averaged information data in June are presented in Figure 6. Contour lines for NO2, PM10 and PM2.5 at position P1 during June.

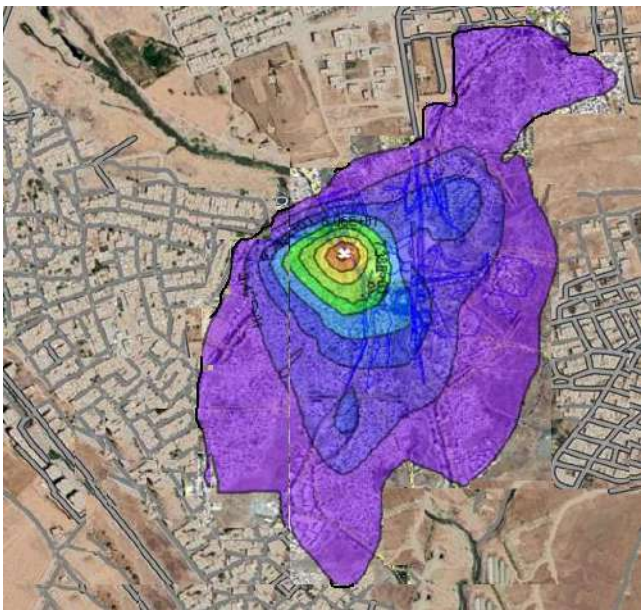

Figure 6. Contour lines for NO2, PM10 and PM2.5 at position P1 during June.

For atmosphere pollution in the factories in Tanjaro region Location Point (P2) hourly statistical chart averaged information data in June are presented in Figure 7. Contour lines for NO2, PM10 and PM2.5 at position P2 during June by using an ISC-AERMOD dispersion model.

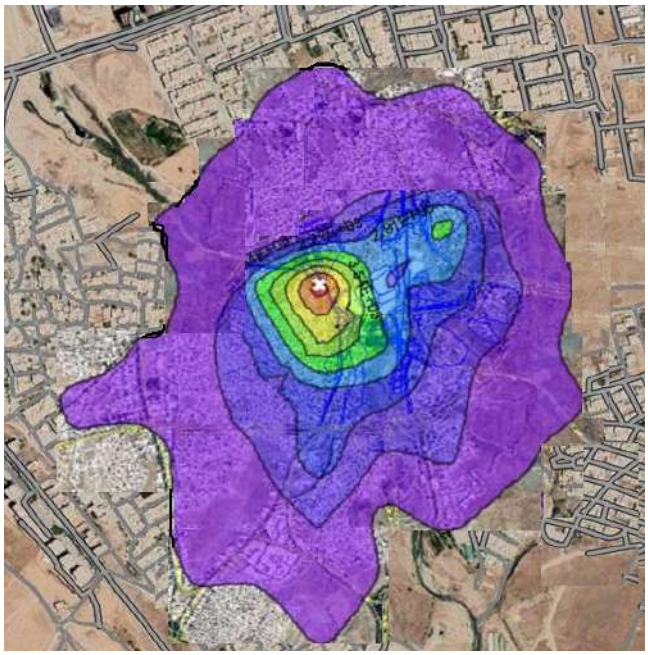

Figure 7. Contour lines for NO2, PM10 and PM2.5 at position P2 during June.

As shown from figure 7., coverage area plot of contaminated NO2 is shown in green, while the statistical plot for polluted PM10 is shown in blue, P?M2.5 polluted in purple, Its clear from the coverage area in Figure 7.

The pollution is in a large proportion and the gases are more intertwined with each other. Location Point (P3) hourly statistical chart averaged information data in June are presented in Figure 8.

For atmosphere pollution in the factories in Tanjaro region Location Point (P2) hourly statistical chart averaged information data in June are presented in Figure 7. Contour lines for NO2, PM10 and PM2.5 at position P2 during June by using an ISC-AERMOD dispersion model. using an ISC-AERMOD dispersion model.

Its clear from the statistical chart in Figure 6. The pollution is in a large proportion and the gases

are more intertwined with each other. statistical plot of contaminated CO is shown in green, while the statistical plot for polluted CH4 is shown in blue, THC polluted in black, and finally NMHC still low.

Observing carbon monoxide (CO) are validated by comparing with observed values at the three point sections, by comparing for the concentrations values and measured values, by demonstrating an acceptable model performance. The simulation Results performed that the Industrial District area is facing high concentrations of CO. This is due to the high degree of pollution that this area suffers from due to the large number of factories and factories that need to emit smoke that pollutes the place, which affects human health as well.

4. Conclusion

The aim of this paper is Study the experiment measurement and the Pollutant of traffic emissions of experimentally then showed the Pollutant of traffic emissions for this paper of pollutant dispersion within also around the Industrial District. Mathematical scheming used an (AERMOD) software dispersion model. This is due to the high degree of pollution that this area suffers from due to the large number of factories and factories that need to emit smoke that pollutes the place, which affects human health as well. Study of the experiment measurement and the Pollutant of traffic emissions of Nitrogen dioxide (NO2)quality around the Tanjaro region in Sulaymaniya city in the north of Iraq (Kurdistan), where the Nitrogen dioxide (NO2) conducted experimentally then showed the Pollutant of traffic emissions for Experimental study was performed to measure existing air quality. Numerical study was done to model the extent of pollutant dispersion within and around the factories area. Pollutant measurements were carried out using an air quality mobile laboratory at three points sections. Numerical calculations were made using an ISC-AERMOD dispersion model. Concentrations of traffic emissions including Nitrogen dioxide (NO2)is presented and analyzed. The calculated concentrations are validated by comparing with observed values at the three point sections. The results showed good agreement between evaluated concentrations and measured values, by demonstrating an acceptable model performanc. Results show that the factories area is experiencing high concentrations of NO2. High buildings around the factories area act as flow obstacles. Mean pollutant dispersion was toward the north and northeast factories area in Tanjaro region by using ISC-AERMOD during January were observed highest mean concentrations in the last mentioned month .

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