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Assessing the relationship of Air Pollutants to Ambient Temperature in Jimeta Metropolitan Area of Adamawa State, Nigeria

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Abstract

The research studied the influence of some air pollutants on the temperature at four selected locations in Jimeta metropolis. The objective was to determine the influence of air pollutants (CO, NO_2 and SO_2) on the ambient temperature of the study area. The four selected locations are within the commercial center of the city. The samples were collected three times a day, once a week, four times a month for a period of six months between the months of February to July 2023, twelve (12) days of dry season and twelve (12) days of wet season. Simple regression was applied for data analysis, tested at a 0.05 level of significance. The finding of the study revealed that CO_2 appears to have the most significant and relatively stronger relationship with the dependent variable, both in terms of statistical significance and the percentage of variance explained. NO_2 shows a moderate relationship, while SO_2 has the weakest relationship among the pollutants considered. While other pollutants contribute less during the dry season, the pollutants were insignificant during the wet season. The study therefore recommends government and private partnerships into mass transit buses at strategic locations to reduce the emission of pollutants, and relocate some of the commercial centers to other areas of the city.

Keywords: Temperature, road transport, Air pollutants CO, NO_2, SO_2.

I. Introduction

Road transport emissions contribute significantly to air pollution, which indirectly influences climatic elements through various mechanisms. This is partly responsible for ozone depletion and climate change. Atmospheric drivers are generally controlled by meteorological factors such as (temperature, humidity, wind speed and direction, etc.). Remarkably influence the tendency for the release of atmospheric toxins into the environment (Ibe et al., 2017). Air pollution might have a linkage to meteorological conditions or otherwise. A few studies have been conducted to analyze the linkage of air pollutants and weather elements A study in Taiwan reveals that temperature was significant with the incidence of Carbon dioxide negativity. A Bayesian Network graphical model was used to analyze the statistical dependencies between environmental parameters, air pollutant variables and health records (Vitolo et al., 2018), found the maximum aerosol optical depth (AOD) in Palangka Raya, Pontianak, and Jambi happened in the dry season from July to October. The historical data of Air Quality Index (AQI) and meteorological conditions in Jakarta record some important information, but almost no research has been done on the possible impacts of meteorological factors on criterion air pollutants in this rapidly growing urban area (Teny, 2023).

Air pollution results from the combination of high emissions and unfavorable weather. Emitted gases include sulfur dioxide, nitrogen oxides, carbon monoxide, hydrocarbons, etc., These gases are emitted into the air. The emitted particulate matter varies from smoke, dust, fumes, aerosol, radioactive materials, and many others, These concentrations may produce undesirable effects on man and the ecosystem (Rai et al., 2011).

Road transport emissions are a source of pollution in urban areas which contributes to the urban heat island effect. The release of pollutants like nitrogen oxides, volatile organic compounds, and particulate matter (pm) from vehicles can increase the concentration of heat-trapping pollutants in cities, exacerbating temperature rises in urban areas compared to surrounding rural regions.

Motor vehicles are a major source of greenhouse gas emissions, particularly carbon dioxide (CO_2). These emissions contribute to the accumulation of greenhouse gases in the atmosphere, leading to global warming and increased average temperatures over time. Motor vehicle emissions contribute significantly to air pollution, which can indirectly influence temperature through various mechanisms.

Emissions contribute a certain amount of temperature; these vary based on regional and local factors. It's important to note that the contribution of motor vehicle emissions to air pollution and temperature is just one component of the larger climate system. Other factors, such as industrial emissions, energy production, and natural climate variability, also play significant roles in determining temperature patterns.

Temperature changes in the seasons or time of year have been noted to have an impact on the air quality that has been observed because they may affect how well air pollutants disperse by affecting the concentration of those pollutants in the atmosphere, which may be reduced or increased. Differences in the ambient temperature, relative humidity, wind speed including wind direction could also vary in the concentration of atmospheric pollutants over the seasons (Kim et al., 2015). Especially, in this region of the world, where there are two distinct seasons, the atmospheric pollutants may vary spatially. For example, during the dry season, when the relative humidity is moderately low and the wind velocity is higher, the pollutants have a higher tendency to be swiftly dispersed. As noted by Bhatia (2011), air pollutants are dispersed more during the dry season than during the wet season.

In most developing countries, motor vehicles cause serious air pollution due to their concentration in a few large cities and mostly second-grade vehicles without maintenance. In Nigeria, the increasing trend of importing used vehicles is contributing to air pollution and degradation of the environment despite the global efforts to reduce environmental problems caused by mobile transportation (Atubi, 2015). According to Oludare et al. (2016), transport is a vital parts of modern life whereby there is an opportunity to travel short and long distances for personal development and professional activities. More importantly, the economic development of entire regions depends on the easy access to people, goods, and services assured by contemporary transport technology because of its flexibility.

Motor vehicle emissions, along with other sources of pollution in urban areas, contribute to the urban heat island effect. The release of pollutants like nitrogen oxides (NOx), volatile organic compounds (VOCs), and particulate matter (pm) from vehicles can increase the concentration of heat-trapping pollutants in cities, exacerbating temperature rises in urban areas compared to surrounding rural regions. Vehicular growth has not been checked properly by environmental regulating authorities leading to increased levels of pollution (Ngele & Onwu, 2014). Traffic air pollutants is a major pillar of changing temperature, though growing levels of motorization and lack of proper management of urban traffic situations as concerns about the negative effects of urban transportation are now prominent issues due to the increasing deterioration of urban air quality (Xia et al., 2013). A study conducted by Arghadeep (2023) shows the concentration of air pollutants and the impact of meteorological factors on these pollutants were correlated using the Spearman correlation technique. Examining the possible impact of meteorological conditions on air concentrations was made possible by contrasting the multiple linear regression (MLR) models. contaminants.

Jimeta Metropolitan in particular is experiencing an increase in per-capital vehicle ownership (State Licensing Office, 2012). This situation is leading to a slow flow of traffic and longer times spent in congestions, which in turn increase the burning of fossil fuel thereby polluting the air. The resultant effects of motor vehicle emissions on human health cannot be overemphasized as several epidemiological studies have found an association between exposure to atmospheric pollutants and adverse health effects, such as the increase in the number of hospitalizations and mortality, and even a decrease in life expectancy as highlighted by Mateus, Andrea and Nelson, 2011). The sole aim of this study was to examine the influence of air pollutants on the ambient temperature of Jimeta metropolitan area of Adamawa State.

Hypothesis:

H_0: there is no significant relationship between the level of air pollutants and the temperature of the study area.

II. Method and Materials

2.1 Study Area

Jimeta, the administrative city of Adamawa State, known as Yola North Local Government Area lies between latitude 9° 07^{1} to 9° 23^{1}N and longitude 12° 17^{1} to 12° 33^{1} E. It has an altitude of 164m – 200m above sea level. It is bounded by Girei LGA to the north, Yola South LGA to the east, west and south with an aapproximated land area of 231.6 km^{2}. The area is an urban settlement with vegetation sparsely distributed in undeveloped parts. The four locations selected were based on the volume of traffic flow in the area (Adebayo et al., 2020). The area has a typical tropical climate with average daily hours of bright sunshine of about 7 – 8 hours and the wind speed averaging about 76.1 Km/hour and it has an average annual sunshine hour of 2750 approximately. Air temperature characteristics are typical of the West African Savannah Climate. The temperature in this region is generally high throughout the year with the seasonal maximum usually occurring in April, reaching as high as 43 °C.

Temperature characteristics in Adamawa state as a whole are typical of the West African savannah climate. The temperature in this region is generally high throughout the year. In Jimeta, there is a seasonal change, indicating a gradual change from February to April. This is because at these periods the sky becomes clear leading to more receipts of solar radiation. The seasonal maximum usually occurs in April reaching as high as 39.5°C (Adebayo and Zemba, 2003). There is a distinct drop in temperature at the onset of rain due to the effect of clouds. A slight increase after the cessation of rain (October–November) is common before the onset of hamattan in December wind temperature drops further. The minimum temperature value for the area can be as low as 15.4°C between December and January. The commercial area with high volume of transport movement in Jimeta was selected for this study. Figure 1 shows the map of the study area the red point indicate the sampling locations.

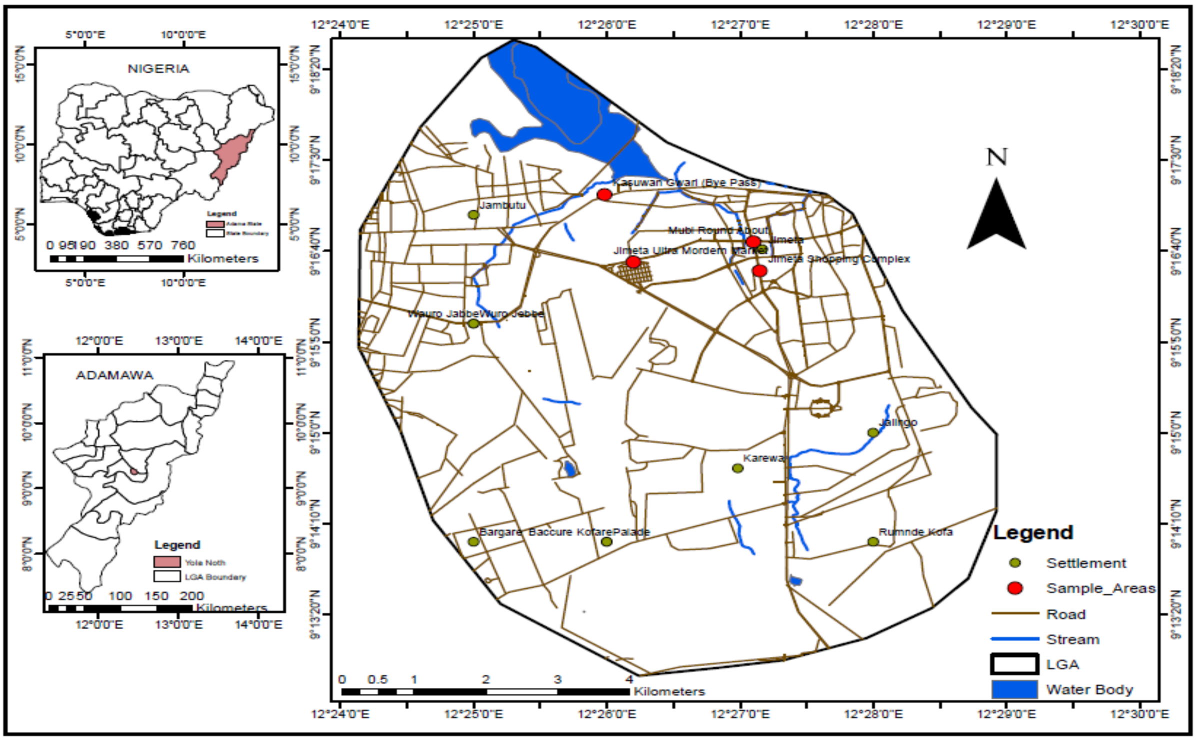


Figure 1: Study Area.

2.2 Methodology

2.2.1 Sampling materials and procedure

The research used primary data which was collected at selected locations. Crowcon (Tetra 3), a portable single-gas monitor for field detection and recordings was used in measuring the concentration levels of emitted pollutants; Carbon Monoxide (CO,) Nitrogen Dioxide (NO_2) and Sulfur Dioxide (SO_2). Digital thermometer was used in measuring the ambient temperature for this study. The air pollutants (CO, SO_2 and NO_2) and the ambient temperature were sampled three times a day, once a week, four times a month, and for a period of six (6) months. Sampling of air pollutants and ambient temperature was carried out within six months. February, March & April for dry season. For the wet season, records were collected from May as the onset, then June and July. Table 1 below shows the locations details where the data were collected.

Table 1: Sampling Locations

Location	Latitude	Longitude	Elevation	Characteristics
Jimeta Modern Market Gate	$9^0$16′34″N	$12^0$26′12″E	169 m	Market center with lager volume of traffic flow & commercial buildings.
Kasuwan Gwari	$9^0$17′11″N	$12^0$25′59″E	162 m	Cereals, fruits and vegetable market, residential & commercial buildings.
Mubi Roundabout	$9^0$16′45″N	$12^0$27′06″E	163 m	City center road connections shops and commercial buildings.
Shopping Complete Gate	$9^0$16’29″N	$12^0$27′09″E	168 m	Digital market (mobile phones &laptops

2.2.3 Procedure of Data Analysis

The statistics techniques applied involve descriptive statistics for the mean values for each pollutant and ambient temperature, while inferential statistics was applied to test the relationship of ambient temperature with each pollutant using simple linear regression at 95% significant level, using Minitab version 2020. The simple linear regression formula is stated below.

Formula: $Y = a + bX$

☐ Y = Dependent Variable (Ambient temperature)

X = Independent variable (CO, NO_2 and SO_2)

A + b = coefficient

III. Results Presentations

The computed results are presented below in tables and charts. It is classified as dry and wet season to distinguish the contribution of each pollutant to the ambient temperature at a particular season. The mean value for the dry season which was collected three times a day (morning, afternoon, and evening) for the pollutants and ambient temperature of the four locations for twelve days during the dry season is presented in Table 2. While mean values for the wet season is presented in Table 3.

Table 2: Mean Records for Dry Season (Air pollutants and Temperature)

	Days	CO	NO_2	SO_2	TEMPERATURE (^{0} C)
Jimeta Main Market	1	10.83	0.42	0.06	35.6
	2	10.67	0.37	0.11	37.0
	3	9.27	0.37	0.09	36.8
	4	11.03	0.47	0.08	36.1
	5	10.00	0.34	0.11	37.3
	6	10.90	0.37	0.13	37.0
	7	10.67	0.32	0.10	37.6
	8	10.8	0.43	0.08	37.0
	9	9.67	0.36	0.14	38.5

	10	10.43	0.36	0.09	38.0
	11	10.13	0.42	0.14	38.4
	12	10.47	0.25	0.07	37.0
Kasuwan Gwari	1	11.23	0.43	0.05	36.2
	2	10.27	0.46	0.09	37.3
	3	11.10	0.33	0.08	37.1
	4	10.67	0.48	0.11	36.5
	5	11.80	0.44	0.06	37.9
	6	10.63	0.44	0.07	37.5
	7	12.90	0.43	0.07	38.1
	8	11.53	0.43	0.08	37.4
	9	10.93	0.41	0.108	38.6
	10	10.27	0.48	0.10	38.5
	11	10.07	0.46	0.09	38.7
	12	11.07	0.42	0.07	37.8
Mubi Roundabout	1	6.60	0.27	0.16	35.4
	2	7.50	0.23	0.17	36.7
	3	7.77	0.23	0.17	36.6
	4	8.00	0.24	0.17	35.8
	5	7.53	0.24	0.17	36.8
	6	7.07	0.26	0.21	36.8
	7	7.53	0.20	0.20	37.4
	8	7.53	0.27	0.14	36.6
	9	9.00	0.24	0.21	38.1
	10	6.93	0.21	0.20	37.5
	11	12.60	0.27	0.13	38.1
	12	8.13	0.24	0.17	36.5
Shopping Complex	1	7.6	0.27	0.18	35.5
	2	8.23	0.25	0.22	36.9
	3	7.27	0.25	0.17	36.8
	4	8.30	0.26	0.23	36.0
	5	7.87	0.25	0.21	36.9
	6	7.37	0.21	0.18	37.0
	7	9.17	0.27	0.22	37.7
	8	7.97	0.22	0.22	36.8
	9	7.90	0.25	0.22	38.2
	10	7.97	0.21	0.18	37.6
	11	8.80	0.22	0.22	38.4
	12	8.37	0.31	0.18	36.9

Source: Fieldwork, 2023

Table 3: Mean Daily Wet Season Record for Four Locations

LOCATION	**Days**	**CO_2**	**NO_2**	**SO_2**	**TEMPERATURE (^{0} C)**
Jimeta Main Market	1	10.70	0.42	0.08	28.8
	2	11.40	0.43	0.08	29.4
	3	9.47	0.34	0.13	28.5
	4	10.30	0.36	0.13	29.2
	5	10.33	0.42	0.07	28.3
	6	9.27	0.32	0.14	30.3
	7	10.23	0.38	0.09	30.3
	8	10.13	0.33	0.13	29.1
	9	10.27	0.34	0.07	43.9
	10	9.27	0.39	0.10	28.9
	11	11.90	0.429	0.09	29.7
	12	10.57	0.323	0.09	28.7

Kasuwan Gwari	1	10.97	0.41	0.05	29.7
	2	11.30	0.46	0.08	29.9
	3	10.03	0.41	0.07	29.2
	4	13.30	0.35	0.08	29.7
	5	10.23	0.42	0.06	29.1
	6	11.67	0.43	0.09	30.7
	7	11.20	0.40	0.06	30.6
	8	10.97	0.53	0.09	29.5
	9	10.07	0.42	0.11	29.8
	10	10.67	0.39	0.06	29.4
	11	12.12	0.34	0.12	30.1
	12	10.87	0.44	0.09	29.3
Mubi Roundabout	1	7.70	0.27	0.14	29.0
	2	8.17	0.26	0.17	29.5
	3	7.10	0.24	0.17	28.6
	4	7.00	0.24	0.17	29.4
	5	7.87	0.26	0.17	28.5
	6	8.00	0.18	0.2	30.0
	7	6.97	0.27	0.14	30.0
	8	8.70	0.27	0.17	28.3
	9	6.3	0.24	0.21	29.2
	10	8.87	0.24	0.20	28.9
	11	7.70	0.27	0.21	29.2
	12	8.00	0.21	0.17	28.8
Shopping Complex	1	8.77	0.24	0.17	29.0
	2	9.12	0.27	0.22	29.5
	3	6.97	0.24	0.19	28.6
	4	9.00	0.21	0.22	29.5
	5	8.83	0.28	0.12	28.7
	6	8.00	0.21	0.22	30.0
	7	8.63	0.27	0.22	30.1
	8	9.17	0.30	0.18	29.0
	9	8.03	0.24	0.22	29.5
	10	9.07	0.29	0.17	28.9
	11	8.77	0.31	0.23	29.1
	12	7.53	0.26	0.22	28.9

Source: Fieldwork, 2023

3.1 Results presentation

3.1.1 Dry Season

The simple linear regression model results determined the relationship and level of contribution of each pollutant to the temperature of the area, in Table 4, and the tiny orange is the indicator on the presented charts in Figures 2, 3, and 4 below tested at 95% level of significance. There appears to be a statistically significant correlation between ambient temperature and CO_2 levels, as indicated by the low p-value of 0.011. Changes in CO_2 levels can account for around 13.31% of the variability temperature as the dependent variable, according to the R-squared value of 13.31%. A somewhat positive linear link between CO_2 and the dependent variable is shown by the positive correlation coefficient (0.36). The pollutant NO_2, with a p-value, of more than 0.05 at 0.148. This implies that there could not be a statistically significant link between NO_2 and the dependent variable. Changes in NO_2 levels can only account for a small portion of the variability in the dependent variable, as indicated by the R-squared value of 4.49%. Indicating a weak positive link, a positive correlation coefficient of 0.21.

The high p-value of 0.531 for SO_2 reveals that the connection between SO_2 and the ambient temperature could not be statistically significant. Changes in SO_2 levels can only account for a very small portion of the variability in the ambient temperature, as indicated by the low R-squared value of 0.80%. Although the correlation is nearly zero, the negative correlation coefficient (-0.09) points to a weak negative linear link.

Table 4: Summary Results for Simple Linear regression Dry season

Pollutants	P value (0.05%)	M Rsq (%)	(r)
CO_2	0.011	13.31	0.36
NO_2	0.148	4.49	0.21
SO_2	0.531	0.80	-0.09

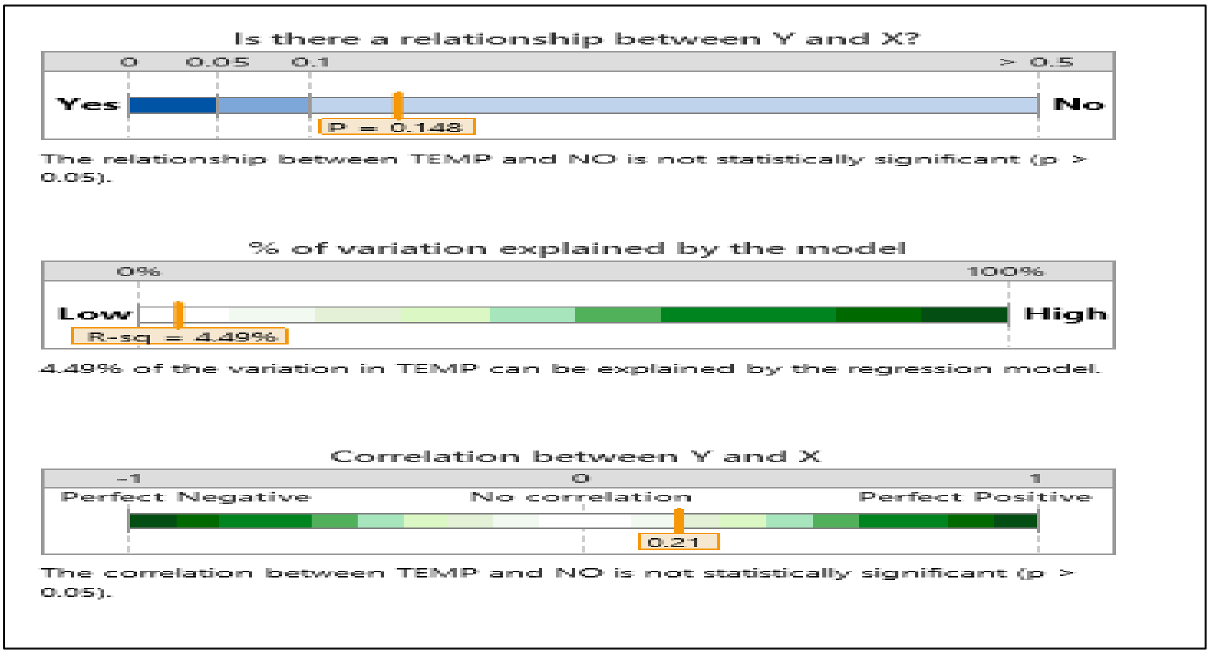
Source: Fieldwork, 2023

The relationship between TEMP and CO is statistically significant (p < 0.05).

13.31% of the variation in TEMP can be explained by the regression model.

The positive correlation (r = 0.36) indicates that when CO increases, TEMP also tends to increase.

Figure 2: Ambient Temperature (Y) & pollutants CO_2 (X)



The relationship between TEMP and NO is not statistically significant (p > 0.05).

4.49% of the variation in TEMP can be explained by the regression model.

The correlation between TEMP and NO is not statistically significant (p > 0.05).

Figure 3: Ambient Temperature (Y) & pollutants NO_2 (X)

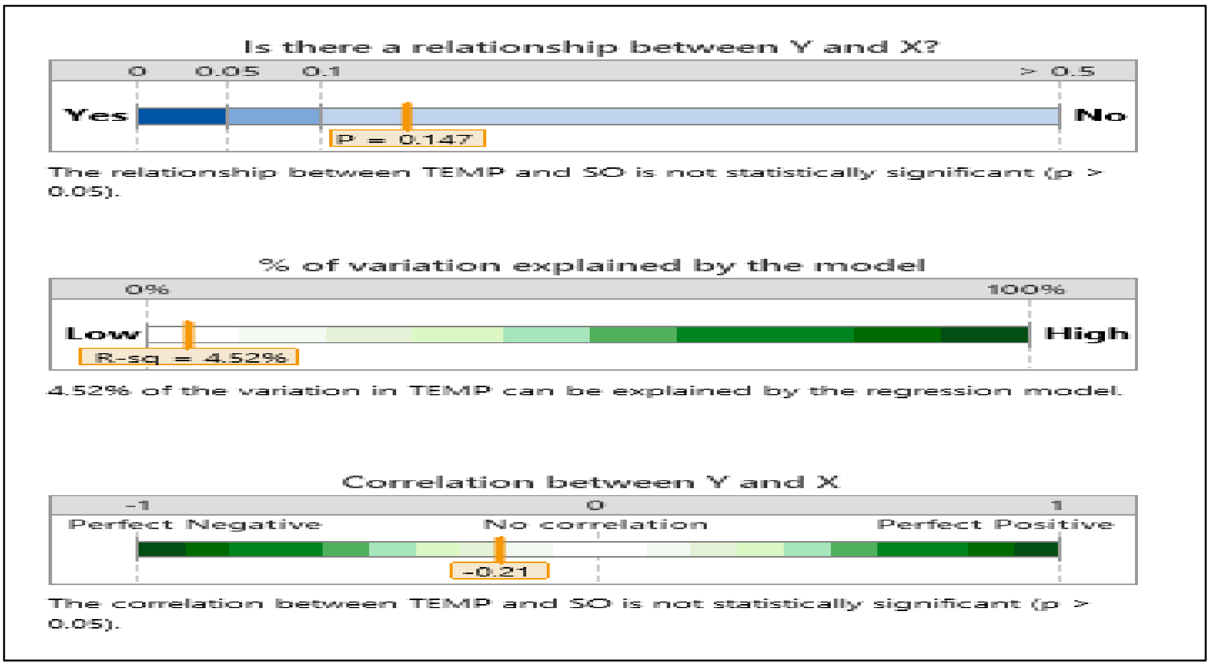


Figure 4: Ambient Temperature (Y) & pollutants SO_2 (X)

3.1.2 Wet Season

The wet season linear regression results were tested at a 0.05% significance level, presented in Table 5, and the tiny orange indicator on the charts shows the P-value, R-squared value, and correlation coefficient. The P-value of 0.258 indicates that the pollutant CO_2 values are not statistically significant. The model only partially explains the variation in CO_2 levels, according to the Rsq value of 2.78%. A slight positive linear association with the variable under study is shown by the positive correlation coefficient (r = 0.17).

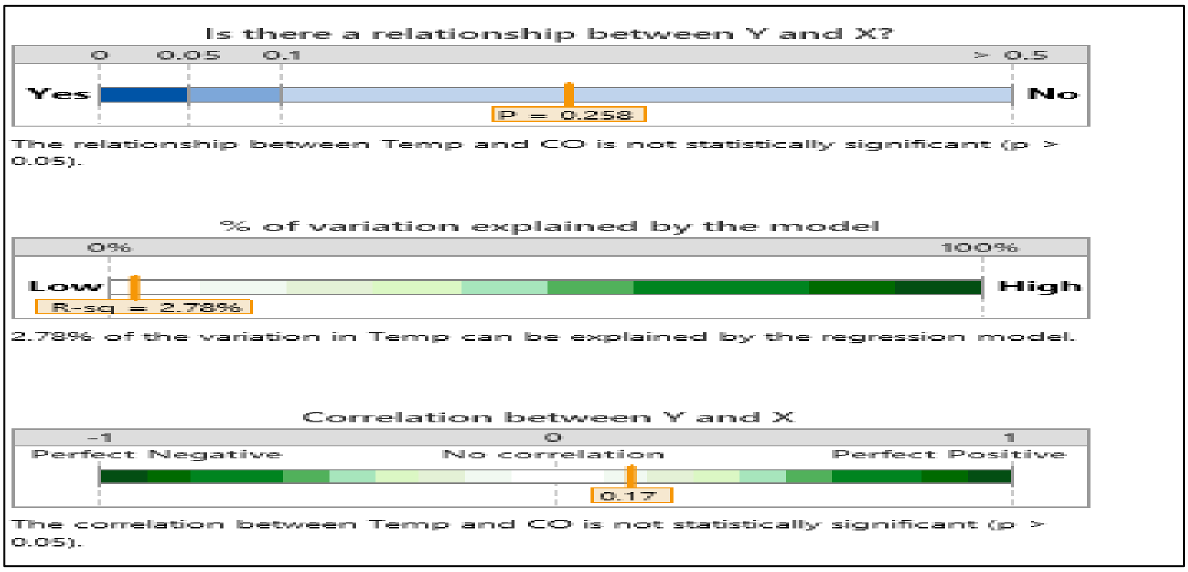
At the 0.05% significance level, the observed values for NO_2 are not statistically significant, as indicated by the larger P-value (0.569). A relatively small portion of the variation in NO_2 levels may be explained by the model, according to the Rsq value of 0.78%. Although it is quite modest, the positive correlation coefficient (r = 0.08) suggests a weak positive linear association.

Even if the observed data is pretty close, the P-value of 0.149 for SO_2 indicates that it is not statistically significant at the 0.05% significance level. The model explains a moderate portion of the variance in SO_2 levels, according to the Rsq value of 4.57%. A weak negative linear link is suggested by the negative correlation coefficient (r = -0.21), which shows that while one variable tends to drop as the other grows, the relationship is not very strong.

Table 5: Summary Results for Simple Linear Regression Wet Season

Pollutants	P value (0.05%)	Rsq (%)	(r)
CO_2	0.258	2.78	0.17
NO_2	0.569	0.78	0.08
SO_2	0.149	4.57	-0.21

Source: Fieldwork, 2023



The relationship between Temp and CO is not statistically significant (p > 0.05).

2.78% of the variation in Temp can be explained by the regression model.

The correlation between Temp and CO is not statistically significant (p > 0.05).

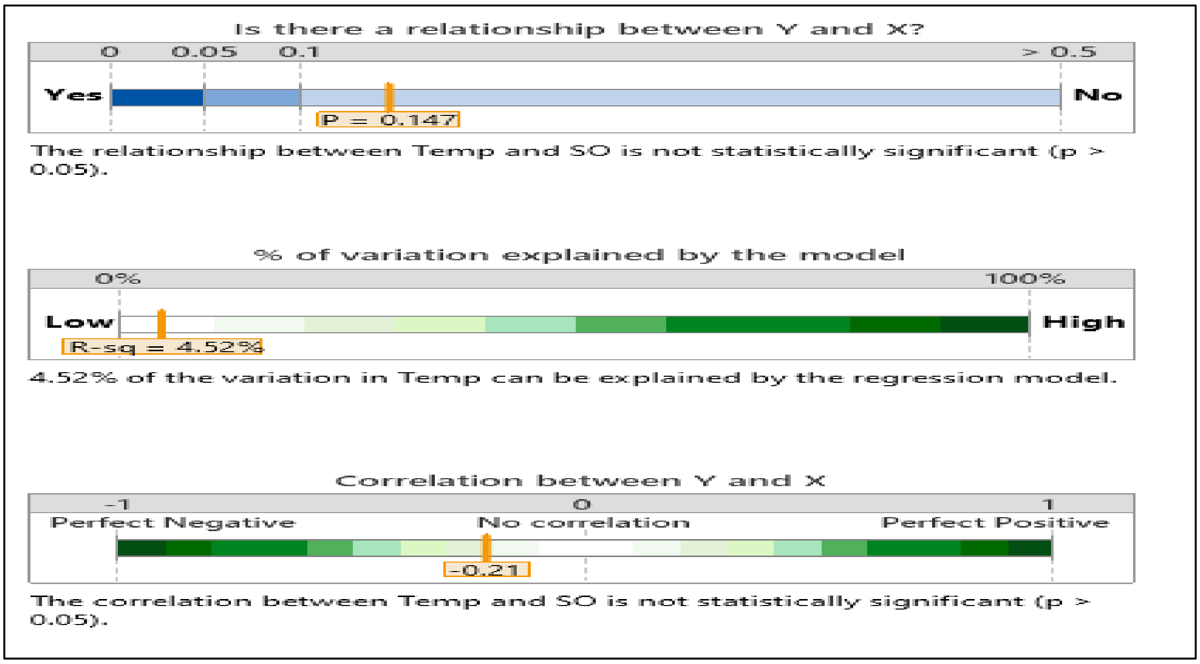
Figure 5: Ambient Temperature (Y) & pollutants CO_2 (X)

The relationship between Temp and NO is not statistically significant (p > 0.05).

0.71% of the variation in Temp can be explained by the regression model.

The correlation between Temp and NO is not statistically significant (p > 0.05).

Figure 6: Ambient Temperature (Y) & pollutants NO_2 (X)



The relationship between Temp and SO is not statistically significant (p > 0.05).

4.52% of the variation in Temp can be explained by the regression model.

The correlation between Temp and SO is not statistically significant (p > 0.05).

Figure 7: Ambient Temperature (Y) & pollutants SO_2 (X)

3.2 Discussions

3.2.1 Dry Season

The regression results for the dry season show pollutant CO_2 with a low p-value of 0.011 suggesting that there is a statistically significant association between CO_2 levels and ambient temperature. The R-squared value indicates that variations in CO_2 levels can explain approximately 13.31% of the variability in temperature. The positive correlation value of 0.36 indicates that there is a relatively positive linear relationship between CO_2 and the ambient temperature. Based on the result above the alternative hypothesis is accepted "There is a significant relationship between the level of air pollutant CO_2 and the temperature of the study area.". These corroborate research on ambient air quality in Ijebu-ode, Abuja, and Orlu, respectively, by Oludare, Olasumbo, and Tope-Ajayi (2016), Otse et al. (2020), and Ibe et al. (2017), concerning various air pollutants like CO_2, NO_2, SO_2, and PM10, has shown unhealthy and very unhealthy atmosphere at different sampling points, necessitating the establishment and strengthening of the health-based standard for air pollutants. The findings also suggest enhancing fuel quality, reducing pollutants, and saving lives. A study in Taiwan reveals that temperature was associated with the incidence of CO_2 poisoning.

The pollutant NO2, at 0.148, has a p-value of higher than 0.05. The R-squared value of 4.49% indicates a low percentage of variation can be allocated to ambient temperature. A strong positive association, as seen by the positive correlation coefficient of 0.21. These justified the research of Barman et al. (2012), where it is stated other factors contributing to air pollutant concentration do not depend on the quantities that are emitted from air pollution sources but also on the ability of the atmosphere to either absorb or dispense these emissions. This justifies the null hypothesis, that there is no significant relationship between the level of air pollutant NO_2 and the temperature of the study area.

The pollutant sulfur dioxide, given the high p-value of 0.531 for SO_2, it is unlikely that there is a statistically significant relationship between SO_2 and ambient temperature. The low R-squared value of 0.80% indicates that variations in SO_2 levels can only explain a very small percentage of the variability in ambient temperature. The negative correlation coefficient (-0.09) indicates a weak negative linear relationship even if the correlation is almost zero. high P-value for NO_2 and ambient temperature. These justified Jonson et al (2021) study stating a close-to-zero Correlation Coefficient (-0.06). This value denotes a modest negative linear association between ambient temperature and NO_2 levels. Although the association is statistically significant, it is essentially insignificant, indicating that variations in NO_2 levels might not have a meaningful impact on temperature variations. The high P-value of 0.589 that was observed indicates that there is no statistically significant link between ambient temperature and nitrogen dioxide (NO_2) levels. The R-squared value: Only a very small portion of the fluctuation in ambient temperature can be explained by changes in NO_2 levels, according to the R-squared value of 0.72%. This restricted capacity for explanation highlights the intricacy of variables impacting temperature fluctuations apart from NO_2 (Jonson et al., 2021).

3.2.2 Wet Season

The P-value, R-squared value, and correlation coefficient level are displayed in the tiny orange indicator on the charts in Figures 5, 6, and 7. The pollutant CO_2 readings are not statistically significant, according to the P-value of 0.258. The Rsq 2.78% indicates that the model explains just a portion of the variation in CO_2 levels. The positive correlation coefficient (r = 0.17) indicates a weak positive linear link with the considered variable. The linear equation shows for (Y) 27.47 + 0.2296(X). At the 0.05% significance level, the observed values for NO_2 are not statistically significant, as indicated by the larger P-value (0.569). A relatively small portion of the variation in NO_2 levels may be explained by the model, according to the Rsq value of 0.78%. Although it is quite modest, the positive correlation coefficient (r = 0.08) suggests a weak positive linear association. The linear model explains for every temperature (Y) 28.91 + 2.219 (X) the pollutant NO_2 contributes.

The linear model for (Y) = 30.77 - 8.229 (X) P-value of 0.149 for SO_2 shows that it is not statistically significant at the 0.05% significance level, even though the observed data is rather near. The Rsq score of 4.57% indicates that the model accounts for a considerable amount of the variance in SO_2 levels. The negative correlation coefficient (r = - 0.21) indicates a weak negative linear link, indicating that although there is a tendency for one measure to decrease as the other increases, the relationship is not very strong. Based on the results for wet season the null hypothesis is accepted “There is no significant relationship between the level of air pollutants and the temperature of the study area. This justifies research in Northeast India; the trend study indicates that although other pollutants are becoming less concentrated in the air in Siliguri, the concentration of NH3 is increasing. The majority of pollutants had a negative relationship with climatic variables; however, their response varied with the season. The results of the comparative regression study demonstrated that the linear and non-linear models take seasonal variations and climatic elements into consideration. The findings of this study will undoubtedly contribute to improving the precision of air pollution forecasts shortly when seasonal variations and meteorological factors are taken into account (Arghadeep, 2023).

IV. Conclusion

In conclusion, the aim was to analyze the influence of air pollutants on temperature. The finding of the study revealed that CO_2 appears to have the most significant and relatively stronger relationship with the dependent variable, both in terms of statistical significance and the percentage of variance explained. NO_2 shows a moderate relationship, while SO_2 has the weakest relationship among the pollutants considered. Because statistical significance by itself does not imply practical significance and because correlation strength should be evaluated cautiously, it is crucial to take the study's constraints and context into account. Furthermore, additional variables and factors that were left out of this analysis could have an impact on pollutant levels. This implies that the overall situation regarding the ambient air pollutants influencing the temperature of Jimeta metropolitan area is poor. Humans, animals, and plants are exposed to high levels of these pollutants which may be of potential health Research gap future studies can elaborate knowledge to determine a long seasonal trend of pollutants and forecast the poising content in the pollutants.

Based on the research findings, the study recommends that there is a need for further research of all the metrological elements to detect a longer period variation for dry and wet season results to identify a specific amount of the poising of the pollutants to health and the environment. It also recommended government and private partnerships into mass transit buses at strategic locations to reduce the emission of pollutants and relocate some of the commercial centers to other areas of the city. Finally, the study recommends the need for public awareness of the negative effects of these pollutants to the ambient temperature of the area.

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