

Sultanate of Oman  
Ministry of Education  
Directorate General of Education in Dhofar Governorate  
Raysut Boys for Basic Education School (Grades 5-12)

GLOBE OMAN



RYSUT School



**A Scientific Research Study Entitled:  
“The Impact of the Raysut Industrial Area on Temperature and Air  
Quality”**

**Students:**

**Mohammed Ali Ahmed Al-Amri  
Fael Salem Fael Ali Fadel**

**Supervision**

**Mohamed Arafa Mohamed  
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## Summary

### Research questions

- ❖ Are there differences in monthly and annual temperatures between Salalah and Resut Over the past ten years ?
- ❖ Does the air quality differ in terms of the amount of pollutants, especially PM 2.5 and PM10 pollutants in both Raysut and Salalah?
- ❖ Can these differences be linked to local environmental factors such as the industrial area?
- ❖ **The research study aims to investigate The impact of the industrial area in Raysut on each of the following:**

1- Temperature( The artificial heat island phenomenon )

2- Air quality variation ( air quality index)

This is done by comparing data from some approved sites such as NASA POWER for temperatures over the past ten years, as well as aqicn.org for measuring air quality over the past year.

For greater accuracy in the investigation, this data was compared between two geographically close regions (Salalah and Raysut ), impact of the similarity of geographical location and proximity to the sea and the difference in industrial activity ( Raysut Industrial Area )was analyzed between them.

### The research study has shown several Conclusions include

#### ❖ Thermally:

1. There is a significant similarity in average temperatures between Raysut and Salalah due to their geographical proximity and coastal location (Arab Sea).
2. Temperature in Raysut increased (0.73+) compared to the average temperature in Salalah (0.59+ ) during the ten years from (2015-2024)

#### ❖ Environmentally

levels pollutants PM 2.5 and PM10 in Raysut may be higher than in Salalah during certain periods of the year due to its proximity to the port, industrial area, ,truck operations, factories, road infrastructure operations, facilities and others.

### Recommendations

- ❖ The environmental impacts of industrial areas depend largely on the extent to which environmental controls such as emissions monitoring, air purification, and waste treatment are actually implemented.
- ❖ Increasing green spaces in industrial areas.

**Basic terms** : ( Air pollutantsPM2.5, PM10 ) Industrial heat island – Global – warming – Acid rain

## Introduction and Literature Review

### Raysut Industrial Area

- ❖ Raysut Industrial Area is one of the main industrial zones in the Dhofar Governorate of the Sultanate of Oman, and includes more than 190 diverse industrial projects in sectors such as plastics manufacturing, food, iron, cables and others, and is an important source of investment and job opportunities in the region. It was opened in November 1992 and is located in Salalah, Dhofar Governorate. The area covers more than 3.1 million square meters and is approximately 4 km from the strategic port of Salalah.
- ❖ Since then, the industrial zone has provided tremendous job opportunities for young people and opened up broader avenues for investment, economic activity and more. However, some have expressed concern about the negative impact of these zones, namely noise pollution and air pollution from factory smoke and vehicle exhaust resulting from the heavy traffic between the factories and the port as well as the activity of trade and industry. This has a particular effect on those with chronic illnesses and the elderly.
- ❖ The research study aims to investigate the impact of the industrial area in Raysut on both temperatures and air quality by comparing Salalah (the city of magic and beauty) with Raysut (the industrial area)
- ❖ A significant discrepancy between temperature and air quality index readings should serve as a warning sign, necessitating the effective implementation of environmental regulations. Conversely, if temperature and air quality are largely similar between Salalah and Raysut, this should reassure those concerned about the negative impacts of industrial areas in general, and also serve as a message of gratitude and appreciation to those responsible for environmental monitoring, and the enforcement of environmental regulations in industrial facilities reflecting their commitment to the health and safety of the citizens of this beloved nation.

### Research questions

- ❖ Are there significant differences in monthly and annual temperatures between Salalah and Resut ) Over the past ten years ?First axis of the research study .
- ❖ Do air quality characteristics differ in terms of the amount of pollutants especially PM2.5 and PM10 pollutants in each of Raysut and Salalah Second axis of the ? research study)
- ❖ Can these differences be linked to local environmental factors such as (the (industrial area and what is the impact of this on environmental life?

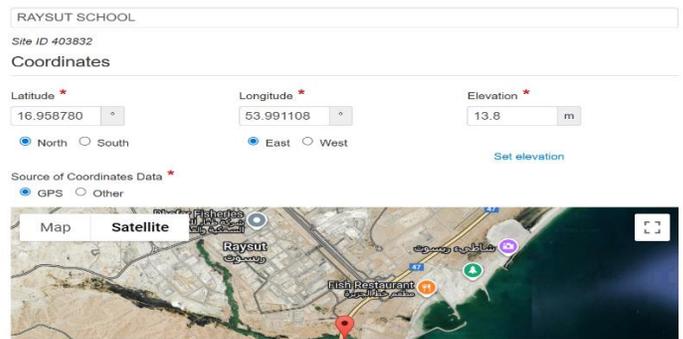
#### **Hypothesis:**

- ❖ Raysut is expected to record higher temperatures than Salalah in some months of the year due to industrial activity and lack of vegetation, while Salalah is more moderate, especially during the autumn season.
- ❖ An increase in air pollutants, especially PM 2.5 pollutants, is also expected and PM10 in Raysut is different from it in the city of Salalah.

## Research methods (methodology) and tools

### ❖ Study site

❖ The images illustrate the location of the research study (area) Raysut (Northern school Raysut for Boys (5-12) )



### ❖ Research Methodology

1) Using the scientific method based on problem-solving and hypothesis formulation.

The first focus of the research study: The effect of the industrial zone on temperatures.	The second focus of the research study: The impact of the industrial zone on air quality.
<ul style="list-style-type: none"> <li>Collecting monthly and annual temperature data for both Salah and Raysut from reliable and trusted sources such as NASA POWER</li> </ul>	<ul style="list-style-type: none"> <li>Collect air quality data from accredited and reliable sources such as aqicn.org and others.</li> </ul>
<ul style="list-style-type: none"> <li>Organizing data in tables such as (CSV and Excel)</li> </ul>	<ul style="list-style-type: none"> <li>Organizing data in tables such as (CSV and Excel)</li> </ul>
<ul style="list-style-type: none"> <li>Calculating the monthly and annual average temperatures over the past ten years (2015-2024)</li> </ul>	<ul style="list-style-type: none"> <li>Comparison of air quality and pollutant data for Salah and Raysut During the past year approximately</li> </ul>
<ul style="list-style-type: none"> <li>Calculating the amount of increase or decrease in temperatures over the past ten years (2015-2024)</li> </ul>	<ul style="list-style-type: none"> <li>Drawing graphs to compare the levels of air pollutants between Salah and Raysut over the past year (2024-2025 )</li> </ul>
Implementation by : Mohammed Ali Ahmed Al-Amri + Supervising Teacher	Implementation: Fael Salem Fael Ali Fadel + Supervising Teacher

3. The results are interpreted graphically to test the hypotheses and determine the extent to which the results matched expectations and the degree of discrepancy between them. The main reasons for any discrepancies between the results and expectations (if any ) are also explained.

### ❖ Research study tools

- ❖ GLOBE- certified site data such as NASA POWER and aqicn.org, and others
- ❖ CVS Applications and EXCEL and graphs (Line charts – Bar charts) and QR code, others for data analysis.

## Results

### **First axis (The impact of the industrial zone on temperatures )**

- ❖ To verify the first hypothesis and the first research question, which is the effect of the industrial area in Raysut on temperatures, and for more accuracy in the investigation, we analyzed NASA POWER temperature data , based on two important factors: ( the location factor and the time factor )
  - 1) **Time factor** : This means comparing temperature results over a specific time period (approximately 10 years)
  - 2) **Location factor** : This means comparing temperature results at two different locations that share several common factors, with only one factor differing and whose effect can be measured.
- ❖ Therefore, we conducted a temperature comparison for the past ten years 2015-2024 as well as a location comparison between Raysut and Salalah due to their geographical proximity, as the distance between them does not exceed a few Kilometers. They also share many common features such as coastal location and altitude above sea level, among others, with one difference being the presence of the industrial area in Raysut, thus making it easy to investigate the impact of its presence.

### **The results we obtained were as following:**

#### **First: Salalah City**

-BEGIN HEADER-

NASA/POWER Source Native Resolution Monthly and Annual

Dates (month/day/year): 01/01/2015 through 12/31/2024 in LST

Location: Latitude 17.015 Longitude 54.0924

Elevation from MERRA-2: Average for 0.5 x 0.625 degree lat / lon area = 336.84 metres

The value for missing source data that cannot be computed or is outside of the sources availability range: -999

Parameter(s):

T2M MERRA-2 Temperature at 2 Meters (C)

-END HEADER-

PARAMETER, YEAR , JAN, FEB , MAR, APR , MAY, JUN , JUL, AUG , SEP, OCT , NOV, DEC , ANN

T2M, 2015, 20.89, 22.03, 23.86, 27.08, 28.12, 28.48, 25.22, 24.94, 25.74, 26.97, 25.59, 22.2, 25.1

T2M, 2016, 21.5, 21.8, 24.13, 26.28, 28.2, 27.77, 24.62, 24.16, 25.02, 24.97, 24.6, 23.75, 24.74

T2M, 2017, 22.53, 21.55, 24.32, 26.82, 27.72, 28.56, 25.21, 24.75, 25.08, 26.01, 25.11, 21.76, 24.96

T2M, 2018, 20.68, 21.36, 24.01, 26.71, 27.75, 26.28, 24.42, 23.21, 22.97, 24.44, 24.36, 22.13, 24.04

T2M, 2019, 21.39, 22.23, 23.45, 26.0, 28.03, 28.21, 25.79, 24.87, 25.53, 26.62, 25.57, 23.76, 25.13

T2M, 2020, 21.38, 22.17, 23.41, 26.32, 28.11, 27.21, 25.85, 24.7, 24.78, 25.57, 24.65, 22.36, 24.71

T2M, 2021, 21.46, 22.66, 25.88, 27.14, 28.17, 27.52, 25.47, 24.67, 26.55, 26.11, 25.96, 23.18, 25.4

T2M, 2022, 21.26, 22.28, 24.88, 27.63, 28.71, 28.0, 25.0, 24.09, 25.29, 25.5, 25.36, 23.39, 25.12

T2M, 2023, 21.96, 22.62, 25.31, 27.14, 28.51, 28.51, 25.76, 25.46, 26.3, 26.44, 26.21, 23.29, 25.64

T2M, 2024, 22.99, 23.54, 25.39, 27.19, 28.93, 28.67, 26.3, 24.66, 25.7, 26.61, 25.94, 22.32, 25.69

## Second: Area Risut

-BEGIN HEADER-

NASA/POWER Source Native Resolution Monthly and Annual

Dates (month/day/year): 01/01/2015 through 12/31/2024 in LST

Location: Latitude 16.9342 Longitude 53.9925

Elevation from MERRA-2: Average for 0.5 x 0.625 degree lat / lon area = 514.09 metres

The value for missing source data that cannot be computed or is outside of the sources availability range: -

999

Parameter(s):

T2M MERRA-2 Temperature at 2 Meters (C)

-END HEADER-

PARAMETER, YEAR, JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, DEC, ANN

T2M, 2015, 18.89, 20.63, 23.26, 26.61, 27.63, 29.68, 25.78, 25.73, 26.01, 26.33, 24.26, 20.32, 24.6

T2M, 2016, 19.97, 20.24, 23.74, 26.07, 28.33, 28.52, 25.46, 25.17, 25.7, 24.7, 23.37, 22.2, 24.46

T2M, 2017, 20.8, 20.04, 23.24, 26.41, 27.22, 29.6, 25.68, 25.79, 25.34, 25.53, 23.83, 19.52, 24.43

T2M, 2018, 18.41, 19.87, 23.31, 26.41, 27.4, 26.43, 24.82, 23.88, 22.43, 23.49, 22.55, 19.85, 23.25

T2M, 2019, 19.51, 20.83, 22.57, 25.31, 28.0, 29.03, 27.29, 26.87, 26.53, 26.07, 24.49, 22.02, 24.89

T2M, 2020, 19.56, 20.84, 22.24, 25.58, 28.03, 27.53, 25.86, 25.68, 25.47, 25.14, 23.47, 20.54, 24.17

T2M, 2021, 19.41, 21.25, 24.96, 26.3, 28.32, 28.51, 25.54, 25.12, 27.31, 25.86, 24.51, 21.18, 24.87

T2M, 2022, 19.65, 20.76, 23.58, 27.38, 29.02, 28.6, 25.84, 25.15, 26.11, 25.0, 24.22, 21.51, 24.75

T2M, 2023, 20.2, 21.0, 24.13, 26.42, 27.98, 29.51, 26.78, 26.03, 27.06, 25.84, 24.4, 20.77, 25.02

T2M, 2024, 20.98, 22.03, 24.24, 26.6, 28.57, 29.07, 27.49, 26.26, 27.12, 26.5, 24.98, 20.17, 25.33

### The second axis (the impact of the industrial zone on air quality)

To verify the second hypothesis and the second research question, which concerns the impact of the industrial area in Raysut on air quality, and to ensure greater accuracy in the investigation, we analyzed data from aqicn.org to measure air quality and the quantity and percentage of pollutants in the air. We selected the most important air pollutants, which are: PM 2.5 and PM 10 also based on two important factors, namely ( the location factor and the time factor) , comparing the amount of pollutants between Salalah and Raysut during the past year (2024-2025 )

#### What is PM 2.5 ?

- **PM:** Abbreviation for "Particulate Matter ".
- **2.5:** Indicates the diameter of the particles in micrometers (2.5 micrometers r )
- It is a mixture of very fine solid and liquid materials that float in the air.

#### Its sources:

Vehicle and factory emissions.

Coal-fired power plants.

Forest and house fires.

Metallic dust.

#### Why is it dangerous?

- **Its small size:** about 20 to 30 times smaller than a human hair, which allows it to remain in the air for long periods.

**Summary:** PM 2.5 is considered one of the most dangerous air pollutants because it penetrates deeply into the body and affects many vital systems.

**PM10 air pollution** (particles with a diameter of less than 10 micrometers ) mainly include natural dust from dry land and wind, dust from construction and agricultural activities, vehicle exhaust, industrial emissions, and waste burning, as well as natural sources such as volcanic ash and pollen. These particles are divided into primary, which are emitted directly, and secondary, which are formed from the reactions of other gases in the atmosphere.

**Human-made resources:**

1. **Vehicles:** Exhaust fumes from cars and trucks that release fine and coarse particles, especially from fuel combustion.
2. **Industry:** Dust and pollutants from factories and grinding and crushing processes.
3. **Construction:** Dust generated from excavation, demolition, and construction work.
4. **Agriculture:** Agricultural activities, such as tilling the land and burning agricultural waste.
5. **Burning waste:** Smoke and toxins emitted from burning garbage or solid waste.

**Natural resources:**

- **Dust and wind:** Dust carried by the wind from bare soil, unpaved roads, and open land.
- **Natural disasters:** volcanic ash and natural fires (forest fires).
- **Biological:** pollen grains, bacterial remains, and small particles from plants.

**Summary:**

**PM 2.5** ,are fine particles mainly resulting from industrial combustion ( factories power plants, fuels)

**PM10** are larger particles resulting from industrial dust and truck traffic.

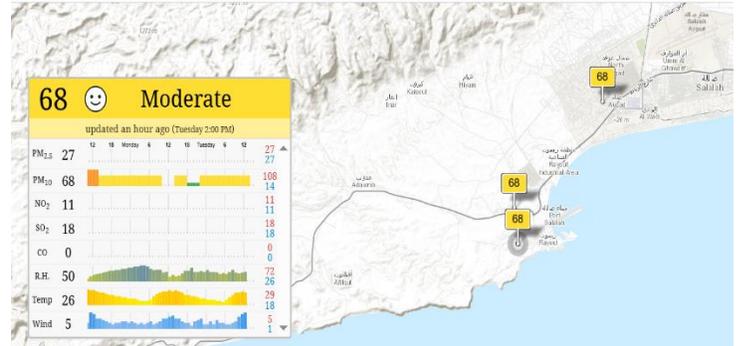
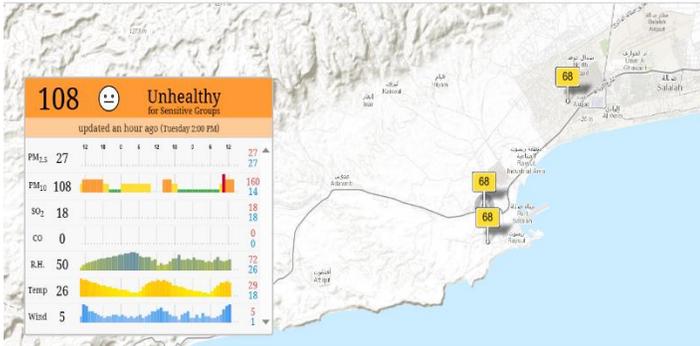
**The international averages for their presence in the environment are as following:**

The table below defines the Air Quality Index scale as defined by the US-EPA 2016 standard:

AQI	Air Pollution Level	Health Implications	Cautionary Statement (for PM2.5)
0 - 50	Good	Air quality is considered satisfactory, and air pollution poses little or no risk	None
51 -100	Moderate	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
101-150	Unhealthy for Sensitive Groups	Members of sensitive groups may experience health effects. The general public is not likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should limit prolonged outdoor exertion.
151-200	Unhealthy	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects	Active children and adults, and people with respiratory disease, such as asthma, should avoid prolonged outdoor exertion; everyone else, especially children, should limit prolonged outdoor exertion
201-300	Very Unhealthy	Health warnings of emergency conditions. The entire population is more likely to be affected.	Active children and adults, and people with respiratory disease, such as asthma, should avoid all outdoor exertion; everyone else, especially children, should limit outdoor exertion.
300+	Hazardous	Health alert: everyone may experience more serious health effects	Everyone should avoid all outdoor exertion

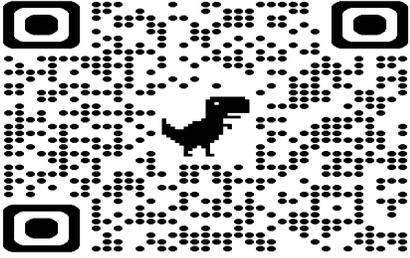
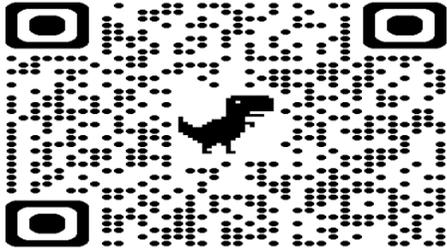
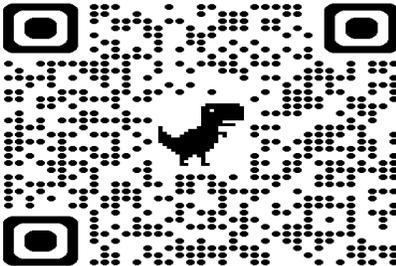
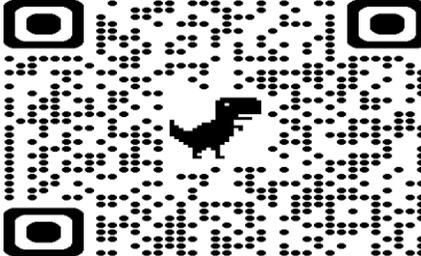
**Raysut North - Salah, Dhofar Governorate, Oman Air Pollution**  
Real-time Air Quality Index (AQI)

**Raysut South - Salah, Dhofar Governorate, Oman Air Pollution**  
Real-time Air Quality Index (AQI)



Images from the site showing PM2.5 and PM10 pollutant level in Raysut and Salah

**The results we obtained were as following:**

Raysut	Salalah	<u>Name of the contaminating substance</u>
		<u>PM 2.5</u>
		<u>PM 10</u>

## Discussion of results

### First axis (The impact of the industrial zone on temperatures)

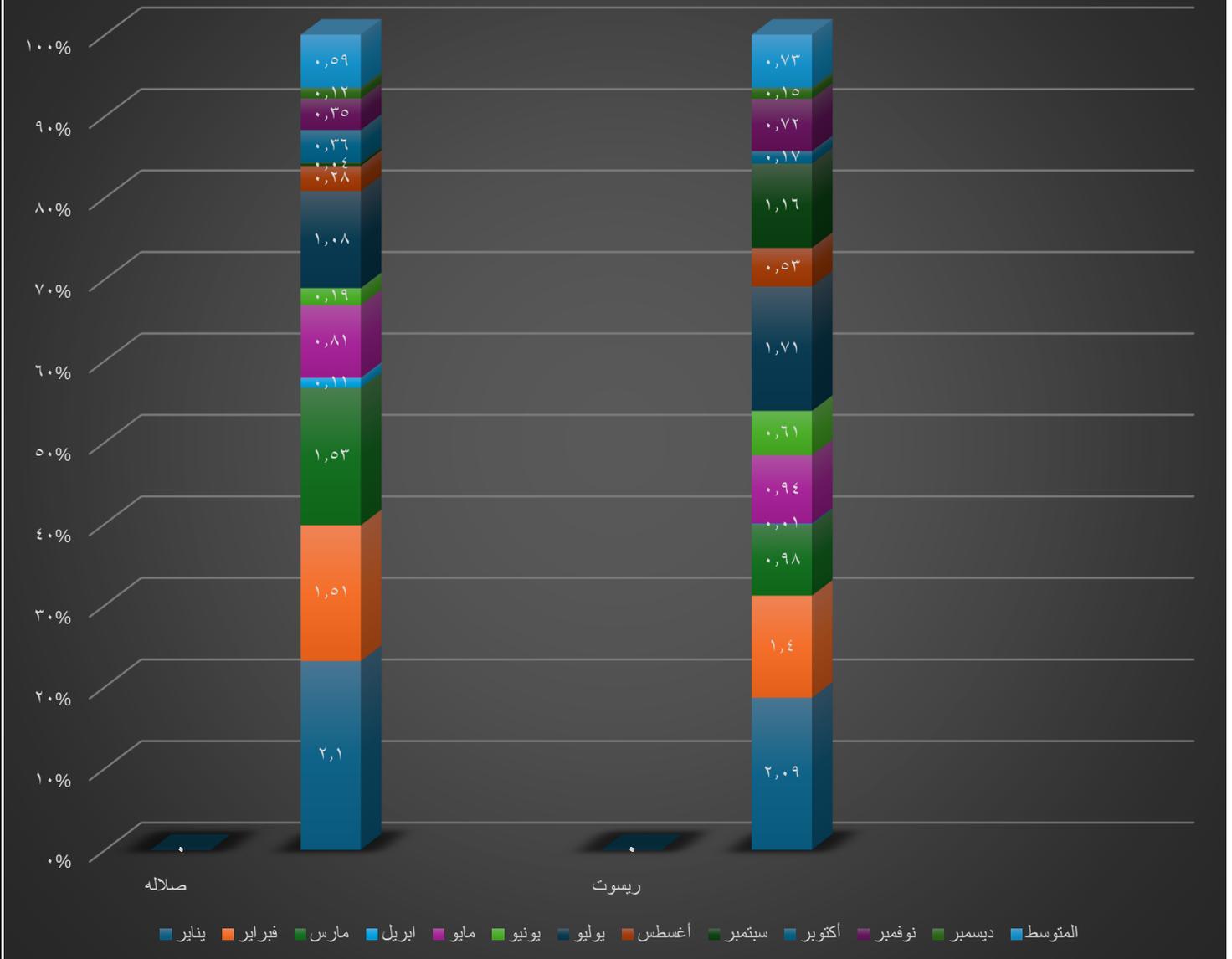
#### First: Salah City

average	Dec.	Nov.	Oct.	Sep.	August	July	June	May	April	March	Feb.	Jan.	Year
25.1	22.2	25.59	26.97	25.74	24.94	25.22	28.48	28.12	27.08	23.86	22.03	20.89	2015
24.74	23.75	24.6	24.97	25.02	24.16	24.62	27.77	28.2	26.28	24.13	21.8	21.5	2016
24.96	21.76	25.11	26.01	25.08	24.75	25.21	28.56	27.72	26.82	24.32	21.55	22.53	2017
24.04	22.13	24.36	24.44	22.97	23.21	24.42	26.28	27.75	24.01	24.01	21.36	20.68	2018
25.13	23.76	25.57	26.62	25.53	24.87	25.79	28.21	28.03	26.0	23.45	22.23	21.39	2019
24.71	22.36	24.65	25.57	24.78	24.7	25.85	27.21	28.11	26.32	23.41	22.17	21.38	2020
25.4	23.18	25.96	26.11	26.55	24.67	25.47	27.52	28.17	27.14	25.88	22.66	21.46	2021
25.12	23.39	25.36	25.5	25.29	24.09	25.0	28.0	28.71	27.63	24.88	22.28	21.26	2022
25.64	23.29	26.21	26.44	26.3	25.46	25.76	28.51	28.51	27.14	25.31	22.62	21.96	2023
25.69	22.32	25.94	26.61	25.7	24.66	26.3	28.67	28.93	27.19	25.39	23.54	22.99	2024
+ 0.59	+ 0.12	+ 0.35	- 0.36	- 0.04	- 0.28	+ 1.08	+ 0.19	+ 0.81	+ 0.11	+ 1.53	+ 1.51	+ 2.1	Increase or decrease

#### Second: Raysut area

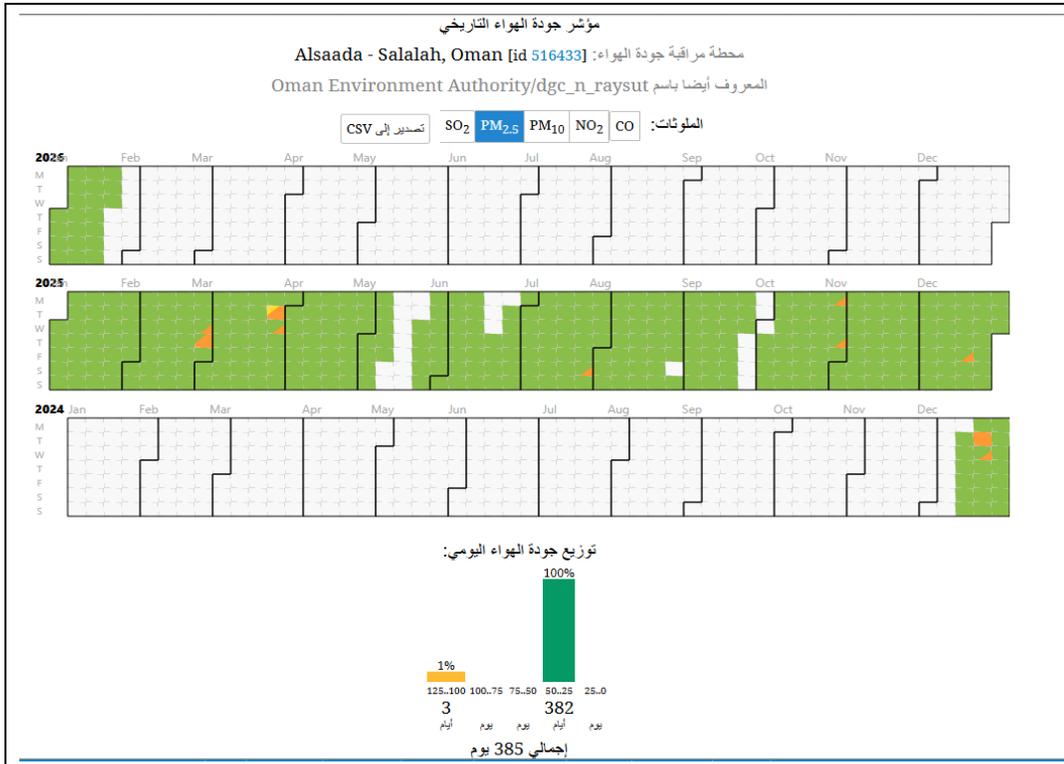
average	Dec.	Nov.	Oct.	Sep.	August	July	June	May	April	March	Feb.	Jan.	Year
24.6	20.32	24.26	26.33	26.01	25.73	25.78	29.68	27.63	26.61	23.26	20.63	18.89	2015
24.46	22.2	23.37	24.7	25.7	25.17	25.46	28.52	28.33	26.07	23.74	20.24	19.97	2016
24.43	19.52	23.83	25.53	25.34	25.79	25.68	29.6	27.22	26.41	23.24	20.04	20.8	2017
23.25	19.85	22.55	23.49	22.43	23.88	24.82	26.43	27.4	26.41	23.31	19.87	18.41	2018
24.89	22.02	24.49	26.07	26.53	26.87	27.29	29.03	28.0	25.31	22.57	20.83	19.51	2019
24.17	20.54	23.47	25.14	25.47	25.68	25.86	27.53	28.03	25.58	22.24	20.84	19.56	2020
24.87	21.18	24.51	25.86	27.31	25.12	25.54	28.51	28.32	26.3	24.96	21.25	19.41	2021
24.75	21.51	24.22	25.0	26.11	25.15	25.84	28.6	29.02	27.38	23.58	20.76	19.65	2022
25.02	20.77	24.4	25.84	27.06	26.03	26.78	29.51	27.98	26.42	24.13	21.0	20.2	2023
25.33	20.17	24.98	26.5	27.12	26.26	27.49	29.07	28.57	26.6	24.24	22.03	20.98	2024
+ 0.73	- 0.15	+ 0.72	+ 0.17	+ 1.16	+ 0.53	+ 1.71	- 0.61	+ 0.94	- 0.01	+ 0.98	+ 1.4	+ 2.09	Increase or decrease

## Temperature comparison



- 1) Both Raysut and Salalah have recorded an increase in temperatures over the past ten years, consistent with the phenomenon of the gradual rise in global temperatures ( global climate change )
- 2) There is a significant similarity in average temperatures between Raysut and Salalah due to their geographical proximity and coastal location (Arab Sea)
- 3) The average temperature in Raysut ( 0.73+ ) is higher than the average but the , temperature in Salalah (0.59+ ) during the ten years from (2015-2024 ) difference between the two remains (0.14) + ) It's not serious
- 4) ,Raysut records slightly higher temperatures in some months of the year especially the summer months.
- 5) Salalah records lower temperatures than Raysut during the autumn period (July August - September -)

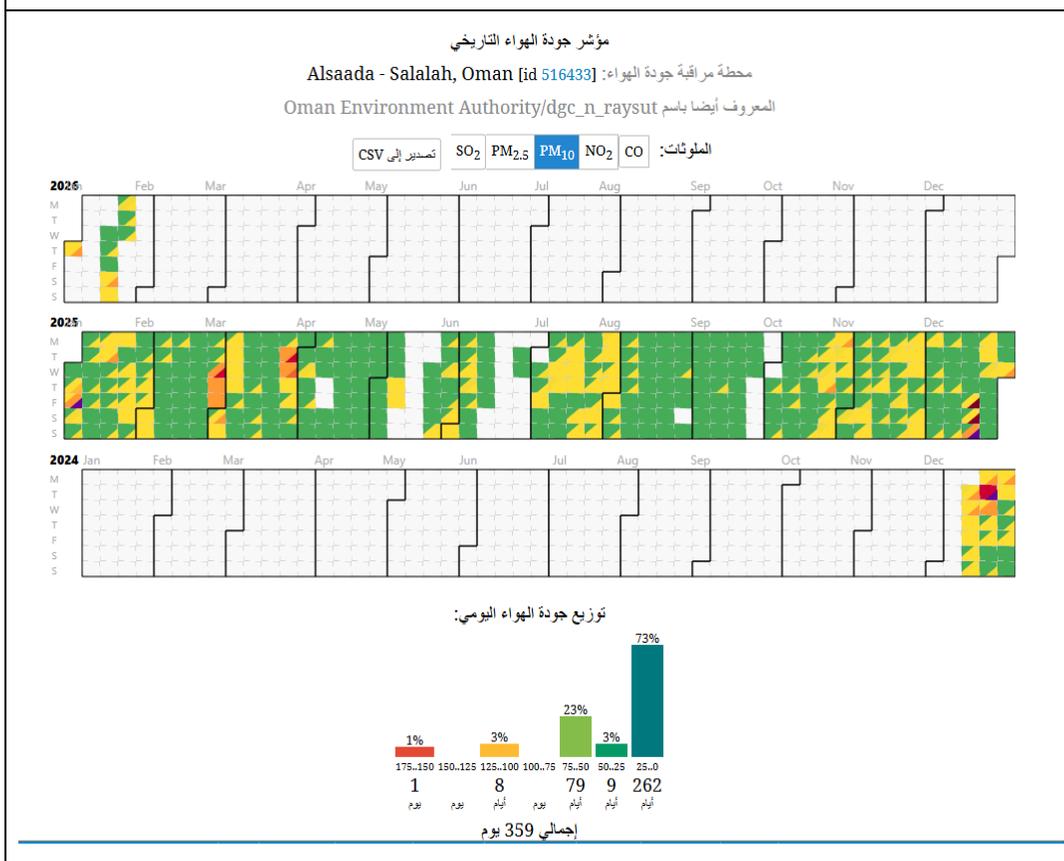
**(Axis) Second: The impact of the industrial area on air quality:**



**Name of the contaminating substance**

**PM 2.5**

**AlSaada Salalah**



**Name of the contaminating substance**

**PM10**

**AlSaada Salalah**

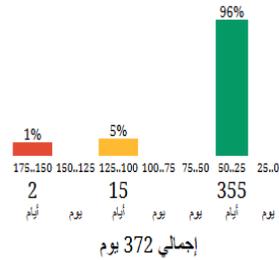
**Name of the  
contaminating  
substance**

**PM2.5**

**Raysut**

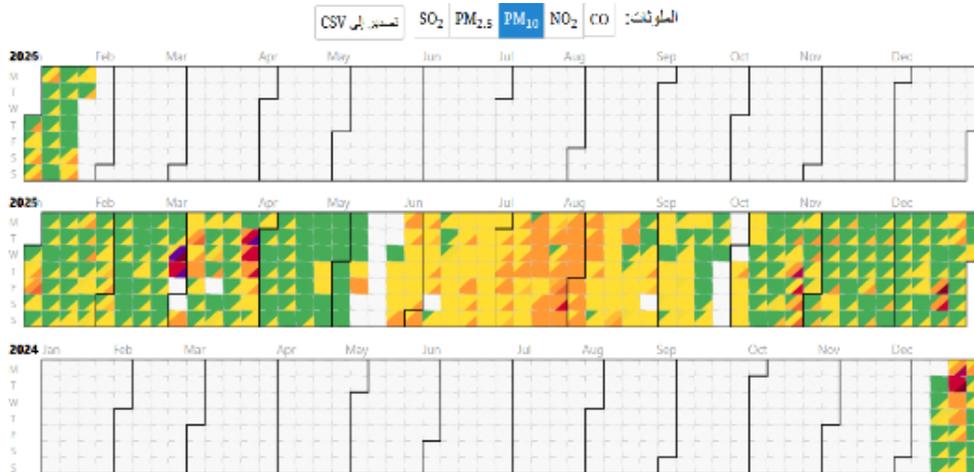


توزيع جودة الهواء اليومي:

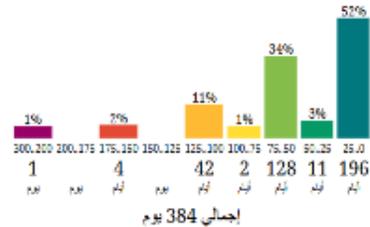


**PM10**

**Raysut**



توزيع جودة الهواء اليومي:



### Regarding the concentration of PM 2.5 air pollutants

- ❖ Salalah records a good daily air quality index of approximately 99.2% with in 382 days out of 385 recording good air quality. The remaining 0.8% fall under the categories of moderate, unhealthy for sensitive groups, unhealthy, very unhealthy, and hazardous.
- ❖ Raysut recorded a good daily air quality index of 95.4%, with 355 out of 372 days recording good air quality. The remaining 4.6% falls under other indicators.

### Regarding the concentration of air pollutants PM 10

- ❖ Salalah's daily air quality index is generally good, at approximately 75.5% with , 271 out of 357 days recording good air quality. The remaining 24.5% falls under other indicators
- ❖ While Raysut recorded a good daily air quality index of approximately 54% with , 207 out of 384 days recording good air quality, the remaining 46% fell under other indicators.

## Conclusions

### **(Axis) First: The effect of the industrial zone on temperatures .**

- By analyzing NASA POWER temperature data based on two factors ( time factor and location factor).

The study shows that local environmental factors (Industrial Area) plays an important role in temperature differences even between geographically close regions ( Raysut and Salalah)

This difference in temperatures is due to several factors, the most important of which are:

- 1) ) Industrial Area in Raysut may contribute to the **local island heat phenomenon** an environmental phenomenon in which temperatures are higher inside cities and urban areas compared to the surrounding rural or natural areas, especially at night ). As a result of industrial activity and infrastructure density Infrastructure.
- ❖ However, the temperature difference between Salalah and Raysut over the ten-year period (2015-2024) did not exceed 0.14 degrees Celsius. This is a very positive indicator that the industrial zone is not experiencing an excessive and alarming rise in temperatures . It also demonstrates the strict adherence to environmental regulations for factories and companies to prevent them from contributing to global warming and acid rain.
- 2) The difference in vegetation cover: Salalah boasts better vegetation cover during the autumn, which helps to lower temperatures. This highlights the need to focus on vegetation in Raysut to compensate for the large areas allocated to roads and buildings for companies and factories.
- 3) Trend analysis shows a slight increase in temperatures in most months over the past ten years, which is consistent with general trends in climate change at the regional level . However, the amount of the increase is not alarming.
- 4) All of the above serves as a message of reassurance to anyone concerned about the negative impact of industrial zones. It is also a message of gratitude to those responsible for monitoring industrial bodies, factories , and companies.

## **(Axis) Second: The impact of the industrial area on air quality .**

By analyzing aqicn.org data on the air quality index based on two factors ( time factor and location factor).() The study shows that local environmental factors (Industrial Area) plays an important role in the variation of air quality and the concentration of air pollutants as following:

- 1- PM 2.5 and PM 10 levels In Raysut Readings in Raysut may reach higher levels more frequently throughout the year compared to Salalah at many times . Evidence of this is the lower air quality index in Raysut compared to Salalah from 99.2% to 95.4% for) PM 2.5) and (from 75.5% to 54 % for PM.10)
- 2- PM 2.5 .between Salalah and Raysut , not exceeding 4% pollutants is similar This is also a good indicator of the safety of the environmental monitoring systems of factories, as the main source of PM 2.5 pollutants is combustion of all kinds, whether it is the combustion of fossil fuels, vehicle exhaust, or waste burning.
- 3- It is also noticeable that the percentage of PM10 air pollutants is high in Salalah (good air quality 75.5 %) due to airborne dust resulting from dust storms and sandstorms. The suspension is in effect from roads, traffic, and limited construction work.  
While the percentage is even higher in Raysut (Good air quality 54 %) for the above reasons, in addition to the excessive car traffic near the port and industrial area , the dust resulting from quarries, cement and flour factoriesand the noticeable activity in the construction of roads and bridges and the establishment of infrastructure for factories and residential areas.
- 4- The dense vegetation in Salalah prevents the formation of air currents laden with dust particles, and this calls for attention to the vegetation cover in Raysut to address the increased concentration of pollutants PM 10 and its negative impact on people with chronic diseases and the elderly.
- 5- It is noticeable from the color gradient of PM 10 pollutants that the most active months are July and August in Raysut, which reinforces the idea of dust activity in the summer and increased industrial activity.

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In conclusion , we have benefited from the GLOBE program in general through problem-solving, data analysis, and finding explanations for many local and global environmental phenomena. The research study we submitted has been particularly beneficial in correcting misconceptions . Previously, it was commonly believed that the term " Industrial area" means ( pollution + diseases + unhealthy environmental life ) , but what we have observed through the research study is that a healthy and suitable environment for living may be available to the extent that environmental requirements for factories and others are applied.

**badges**

- I am a data scientist
- I am cooperative
- I am a problem solver