VARIABILITY ANALYSIS

PRECIPITATION PATTERN, PM2.5, CO2, AND TEMPERATURE

MUEANG DISTRICT, TRANG AND THA SALA DISTRICT, NAKHON SI THAMMARAT, THAILAND

– SAMSEN WITTAYALAI SCHOOL –

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INTRODUCTION

This research examines the **impact** of **rainfall**, **air pollution** (PM2.5 and CO2), and **temperature variability** on southern Thailand's Thasala and Trang regions. These areas face unique environmental challenges as climate change disrupts weather patterns, affecting air quality and agriculture.

By analyzing seasonal trends, pollution sources, and their health impacts, this study aims to provide localized insights to support **sustainable development** and **mitigate climate-related risks** in the region.

MATERIALS AND METHODS

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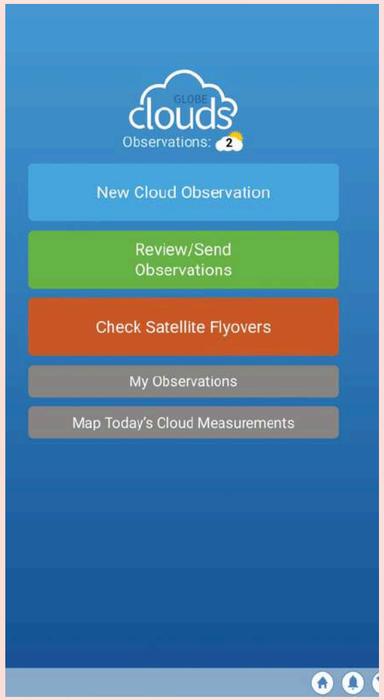

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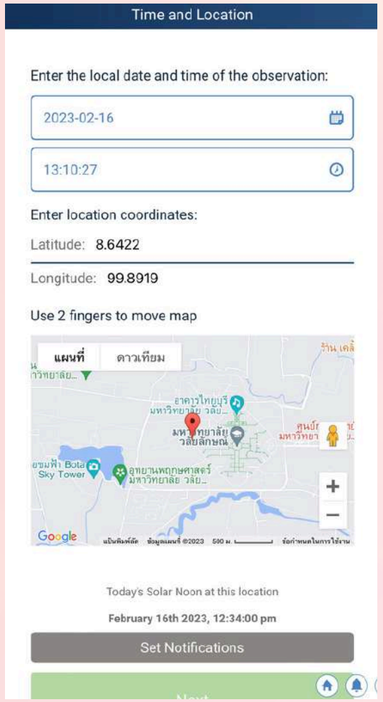

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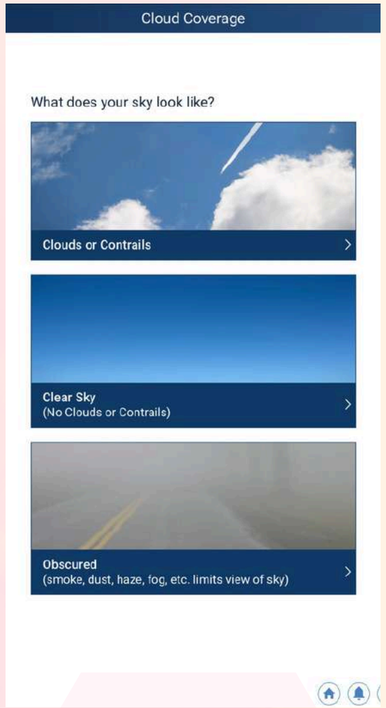


1. choose Cloud App.

2. choose New cloud observation.

3, 4 Observe the sky, the clouds, and don't forget the clouds at the edge of the frame.

Fig3.GLOBE Observer: Cloud App.

STUDY SITE

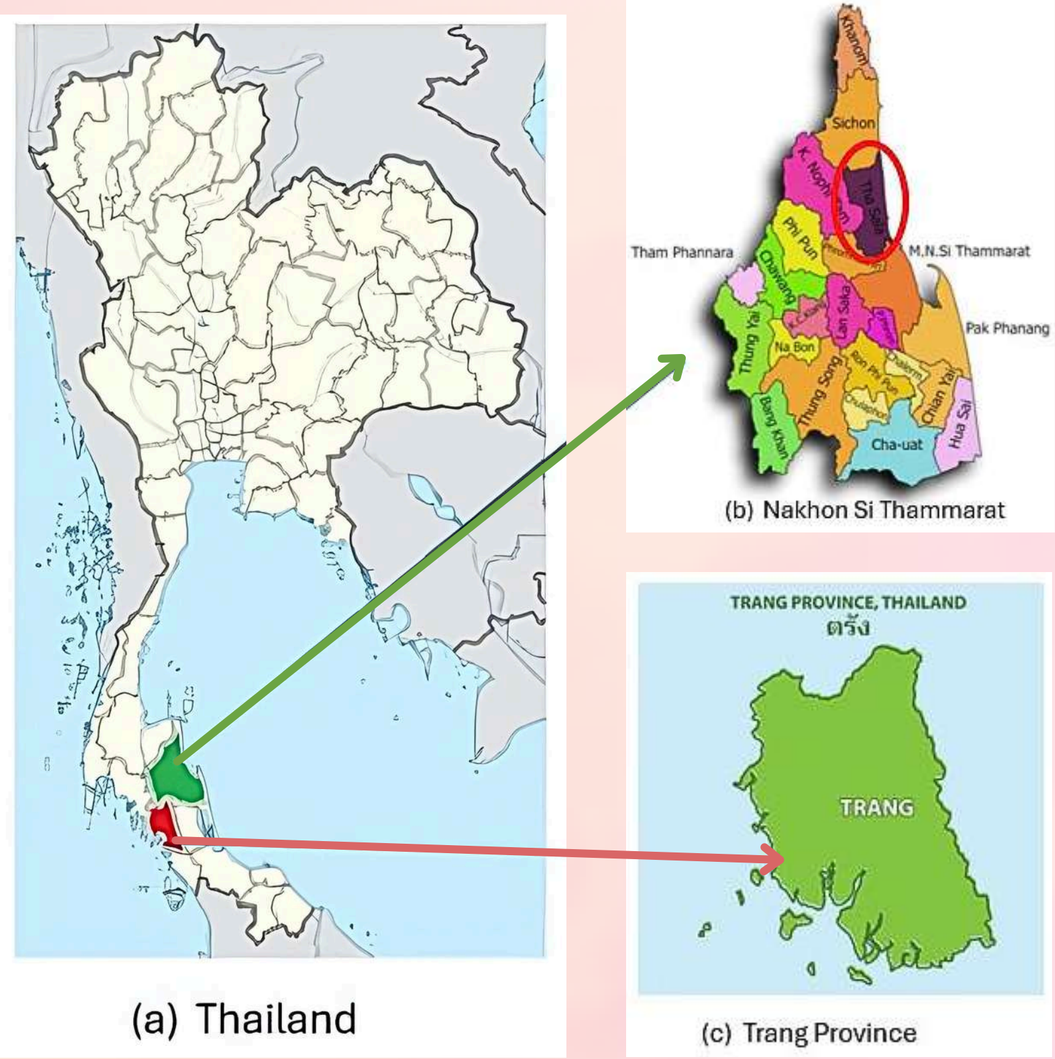


Figure 1

(a) Map of Thailand

(b) Map of Nakhon SI Thammarat showing Tha Sala District

(c) Map of Trang Province

DAVIS WEATHERLINK

Date & Time	CX001.Samsen										
	Inside Temp/Hum								Barometer		
Hide Units	Inside Temp °C	High Inside Temp °C	Low Inside Temp °C	Inside Hum %	High Inside Hum %	Low Inside Hum %	Inside Dew Point °C	Inside Heat Index °C	Barometer mb	High Bar mb	Low Bar mb
12/11/2024 - 00:00	27.5	27.6	27.4	58.8	59.0	58.6	18.7	28.4	1015.7	1015.7	1015.7
12/11/2024 - 00:05	27.4	27.6	27.4	59.0	59.0	58.6	18.7	28.3	1015.6	1015.7	1015.6
12/11/2024 - 00:10	27.4	27.5	27.4	58.8	59.0	58.6	18.7	28.3	1015.7	1015.7	1015.6
12/11/2024 - 00:15	27.4	27.6	27.3	58.8	59.2	58.7	18.7	28.3	1015.6	1015.7	1015.6
12/11/2024 - 00:20	27.4	27.4	27.4	59.0	59.0	58.5	18.7	28.3	1015.6	1015.6	1015.5
12/11/2024 - 00:25	27.3	27.4	27.3	58.7	59.0	58.7	18.6	28.2	1015.5	1015.6	1015.5
12/11/2024 - 00:30	27.3	27.4	27.3	58.9	59.0	58.5	18.6	28.2	1015.5	1015.6	1015.5
12/11/2024 - 00:35	27.3	27.4	27.3	58.9	59.0	58.7	18.6	28.2	1015.5	1015.5	1015.4
12/11/2024 - 00:40	27.3	27.4	27.3	58.9	59.1	58.5	18.6	28.2	1015.4	1015.5	1015.4
12/11/2024 - 00:45	27.3	27.4	27.3	58.9	59.2	58.7	18.6	28.2	1015.4	1015.4	1015.4
12/11/2024 - 00:50	27.3	27.3	27.2	59.1	59.1	58.7	18.7	28.2	1015.3	1015.4	1015.3
12/11/2024 - 00:55	27.2	27.4	27.2	58.9	59.1	58.7	18.5	28.0	1015.2	1015.3	1015.2
12/11/2024 - 01:00	27.3	27.3	27.2	59.1	59.1	58.7	18.7	28.2	1015.2	1015.3	1015.2
12/11/2024 - 01:05	27.3	27.4	27.2	59.1	59.1	58.7	18.6	28.1	1015.1	1015.2	1015.1
12/11/2024 - 01:10	27.3	27.3	27.2	58.5	59.1	58.5	18.4	28.1	1015.1	1015.1	1015.1
12/11/2024 - 01:15	27.3	27.3	27.2	58.7	58.7	58.5	18.5	28.1	1015.0	1015.1	1015.0
12/11/2024 - 01:20	27.2	27.3	27.2	58.7	59.1	58.7	18.4	28.0	1015.0	1015.0	1015.0
12/11/2024 - 01:25	27.2	27.3	27.2	58.9	58.9	58.5	18.5	28.0	1014.9	1015.0	1014.9
12/11/2024 - 01:30	27.2	27.3	27.1	58.7	58.9	58.5	18.4	28.0	1014.9	1014.9	1014.8
12/11/2024 - 01:35	27.2	27.3	27.2	58.5	58.9	58.5	18.3	27.9	1014.8	1014.8	1014.8
12/11/2024 - 01:40	27.2	27.3	27.1	58.5	58.7	58.5	18.3	27.9	1014.7	1014.8	1014.7

Figure 2 shows sample data collected from both devices

These devices forecasts real-time data for a three-day period from 24/12/2025 to 26/12/2024 as shown in Figure 2.

Website:

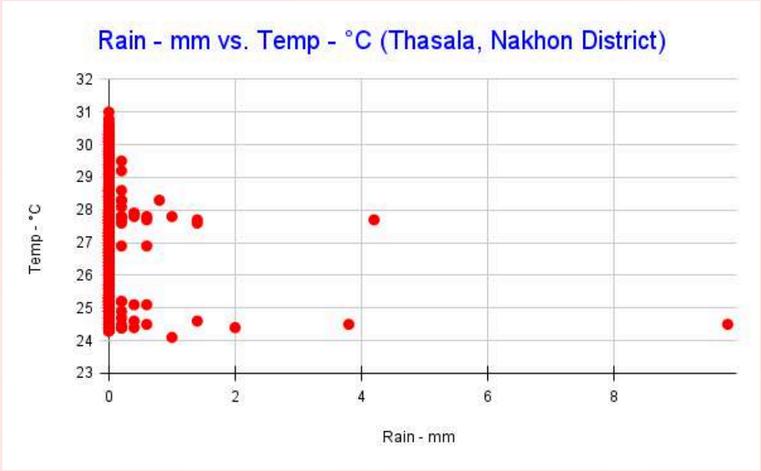
1. Airlink 1, 2, 3 was installed in Tha Sala District, Nakhon Si Thammarat collects data for PMs
2. CX001.Samsen was installed in Nakhon Si Thammarat collects data or Rains and Temperature
3. Davis weatherlink NIA WLLive was installed in Trang to collect data for Rain and Temperature
4. CO2 IoT sensor was installed in Trang to collect CO2 data

The data from the Davis Weatherlink sensors were exported from the weatherlink.com

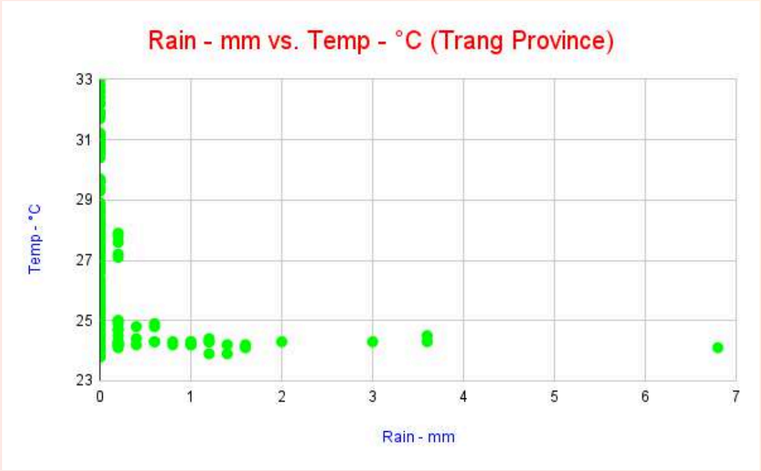
RESULTS AND DISCUSSION

Rain vs Temp

Tha Sala District (Nakhonsithammarat)



Trang Province

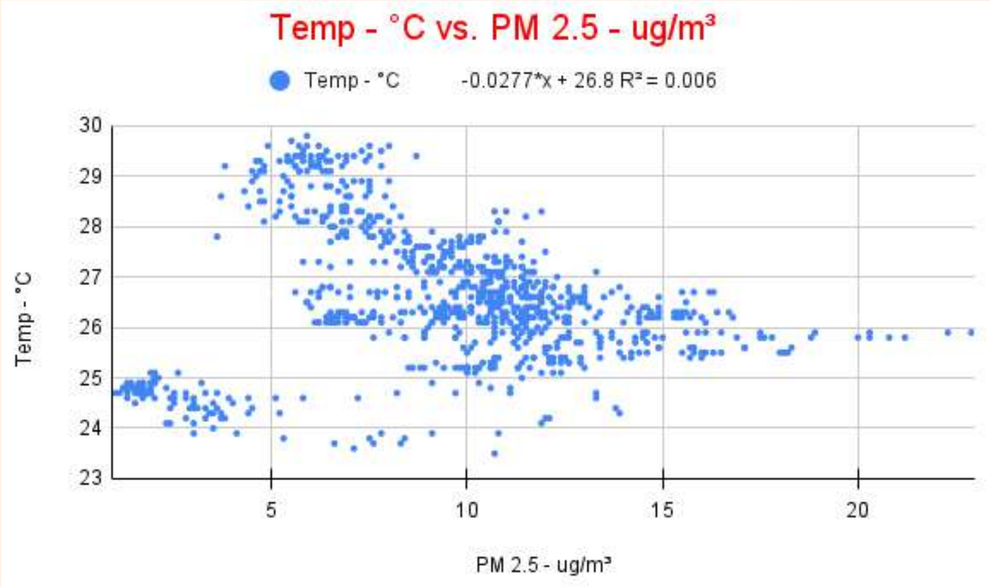


The data shows a weak to moderate inverse relationship between rainfall and temperature in Trang and Thasala, Nakhon District. Higher rainfall (up to 6-8 mm) tends to lower temperatures (23-28°C), while dry conditions increase temperatures (29-33°C).

RESULTS AND DISCUSSION

Temp vs P.M. 2.5

Tha Sala District (Nakhonsithammarat)

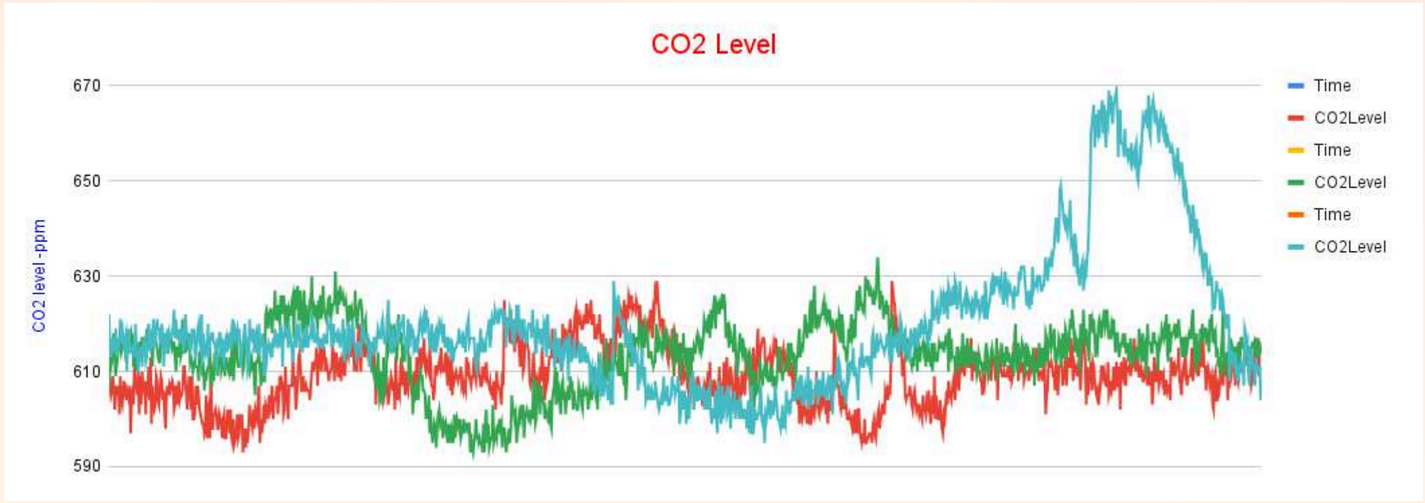


The graph shows a very weak negative relationship between PM2.5 and temperature.
This suggests other factors like weather patterns and emissions play a bigger role in air quality.

RESULTS AND DISCUSSION

CO2 level

Trang Province

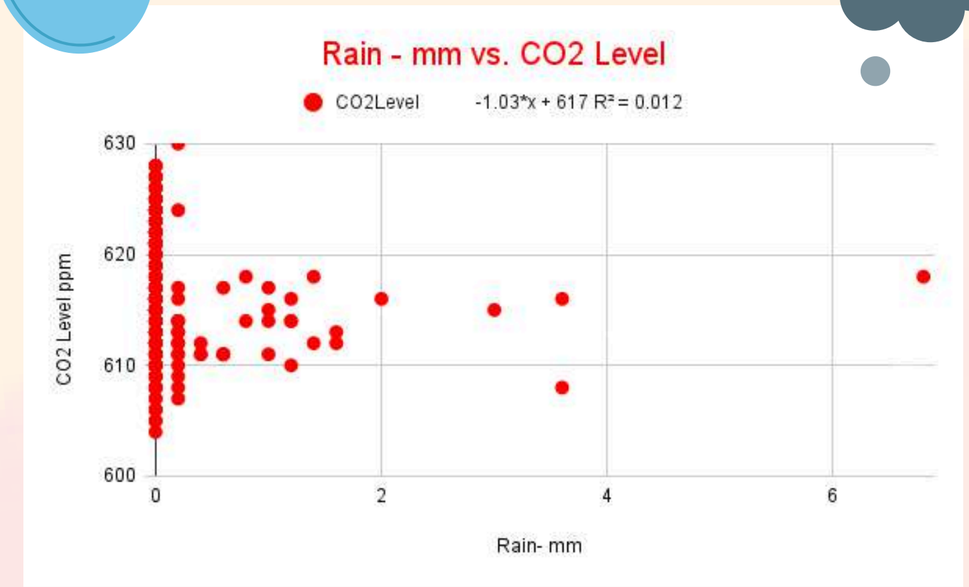


The graph reveals a general upward trend in CO2 levels, suggesting influences from seasonal activities, such as agricultural burning, industrial emissions, or vehicular traffic, common in tropical regions like Southern Thailand.

RESULTS AND DISCUSSION

Rain vs CO2

Trang Province

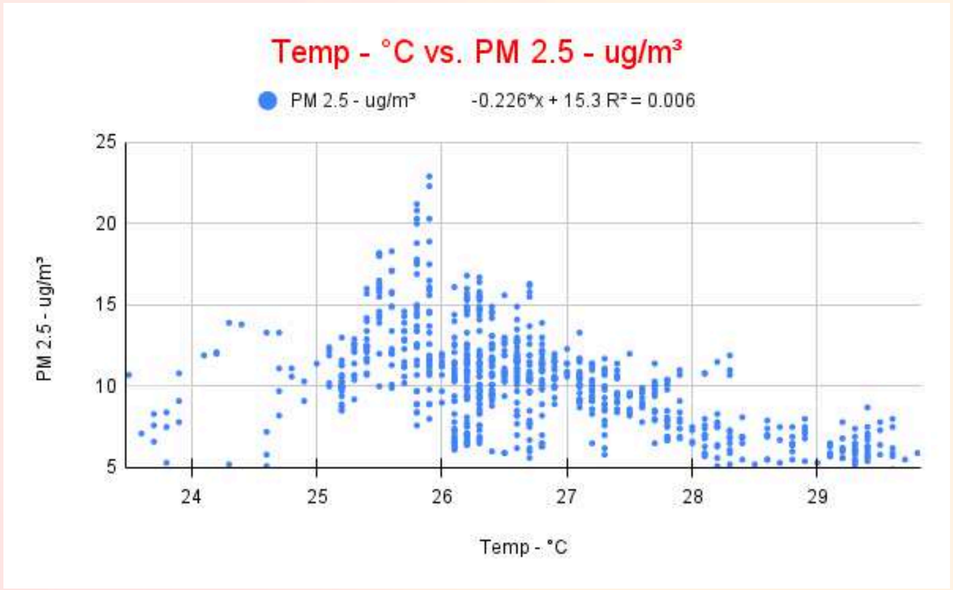


This graph suggests that as rainfall increases, CO2 concentrations tend to decrease slightly.

RESULTS AND DISCUSSION

Temp vs P.M.2.5

Tha Sala District (Nakhonsithammarat)

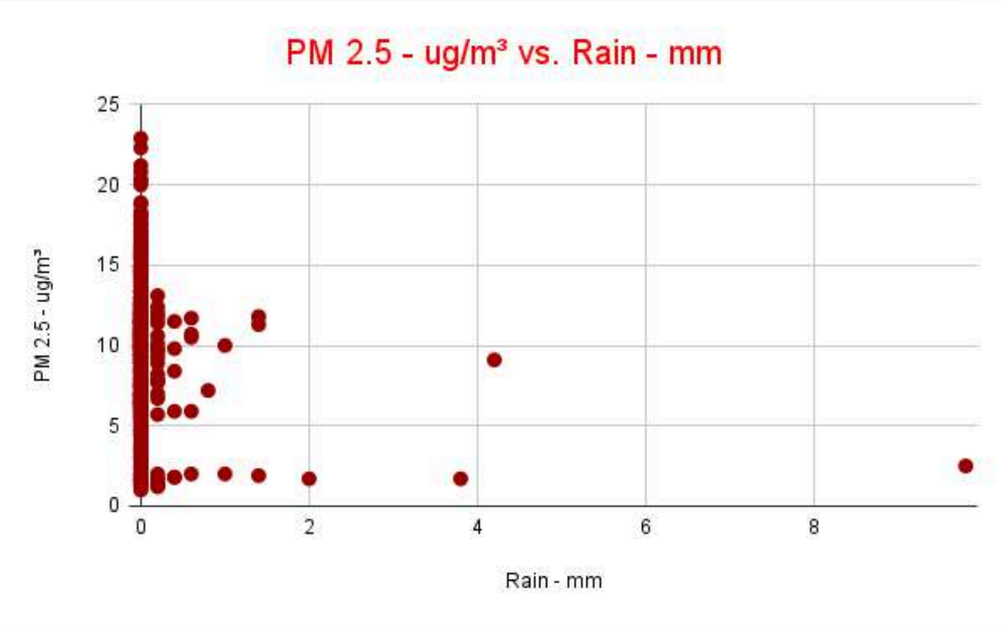


This suggests that as PM2.5 concentrations increase, temperature slightly decreases.

RESULTS AND DISCUSSION

Rain vs P.M.2.5

Tha Sala District (Nakhonsithammarat)

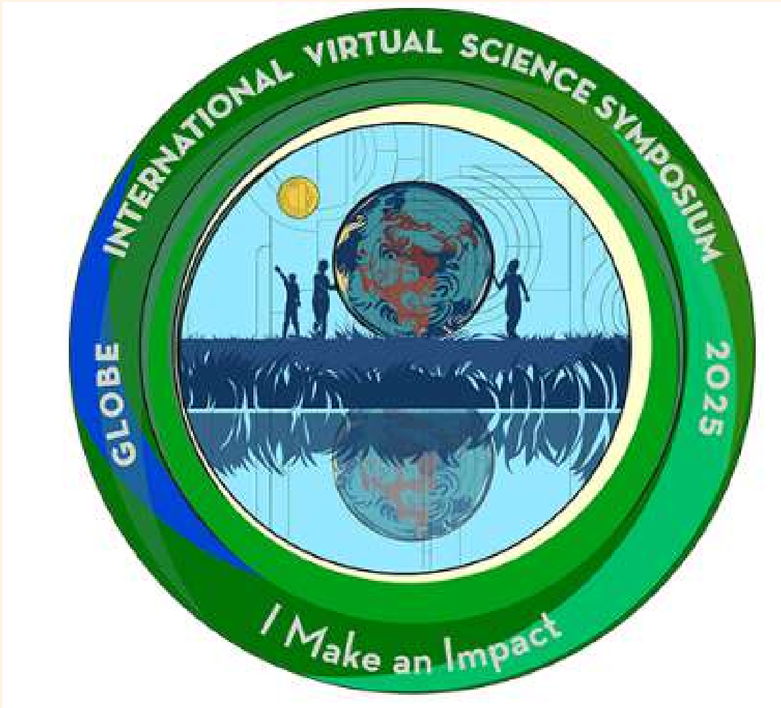


The higher PM2.5 levels predominantly associated with little to no rainfall, on the other hand an increased rainfall corresponds to lower PM2.5 concentrations.

CONCLUSION

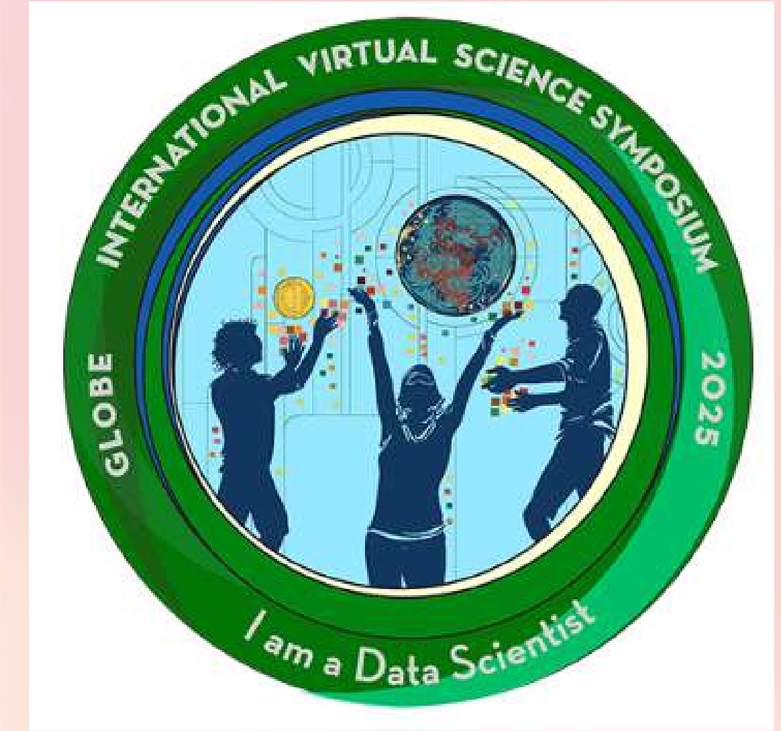
Rainfall in Southern Thailand plays a key role in reducing PM2.5 and CO2 levels while also cooling temperatures, but its impact is limited by other factors like emissions and atmospheric conditions. During dry periods, pollution and heat risks rise, emphasizing the need for better monitoring, emission control, and sustainable practices. Future strategies should integrate weather patterns, pollution sources, and regional cooperation to improve air quality and climate resilience.

IVSS BADGES



I make an impact

I am a STEM professional



I am a data scientist

References

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etc.

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Thank You