

# **Analysis of Singapore's Weather Patterns for STB's Marketing Division's Online Infographic**

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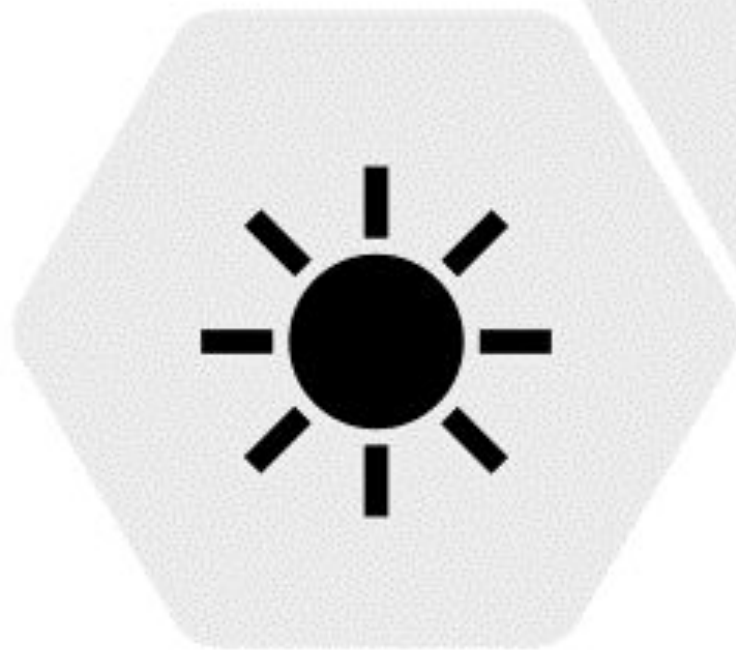
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# Problem Statement

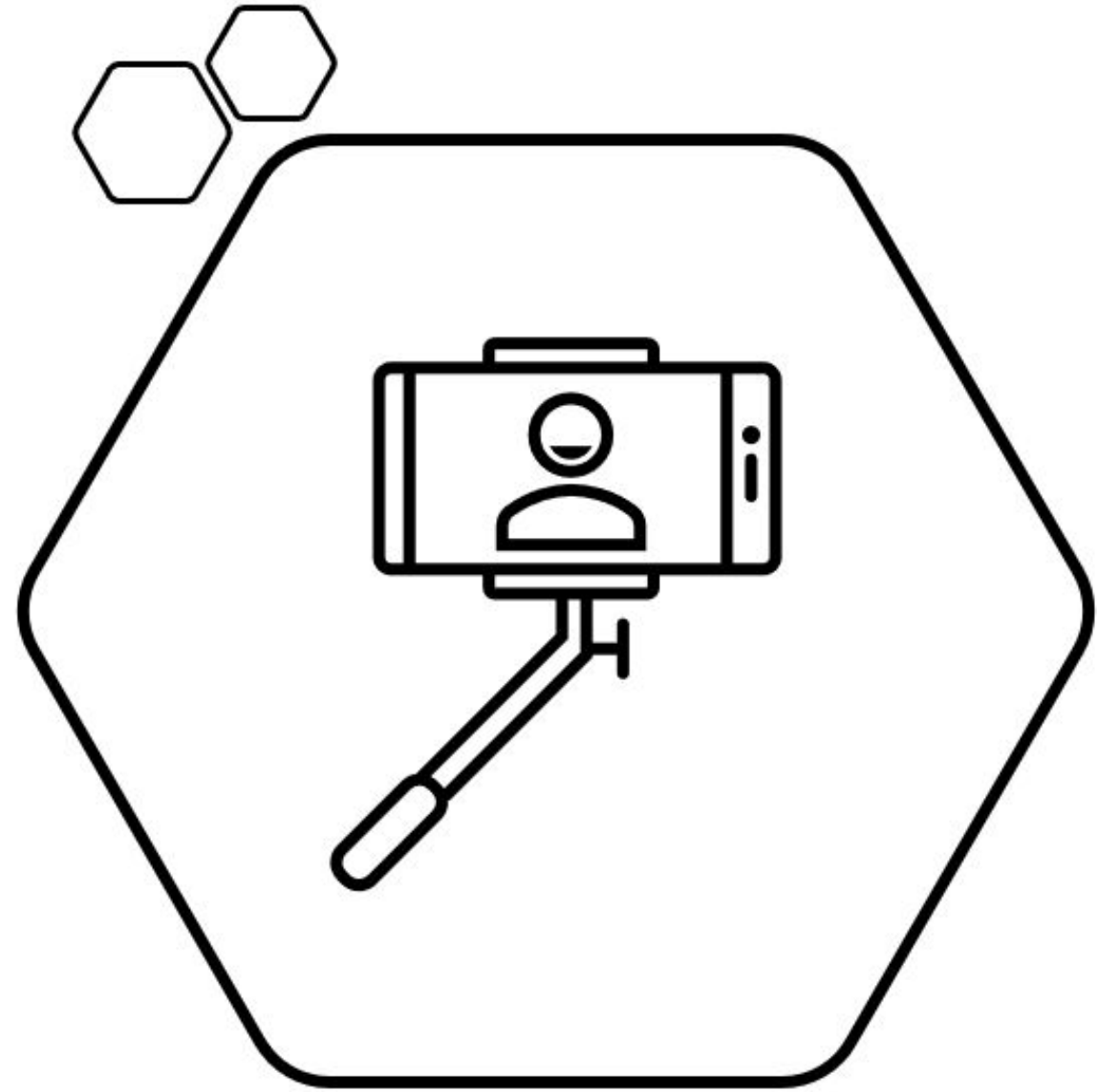
# How to market Singapore to foreigners?

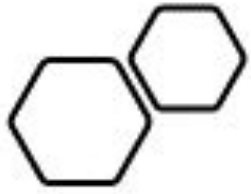
- Singapore's weather is known to be humid, with either sunny or rainy days.
- A data-driven approach to craft Singapore Tourism Board's (STB) marketing message for people who are new to Singapore.



# Helping tourist plan their visit

- Infographic guide for anyone interested in outdoor activities
- Questions we hope to answer:
  - Has Singapore gotten warmer and rainier?
  - Which months are best for outdoor activities?
  - What does this mean for tourists looking for a fun day out in Singapore?





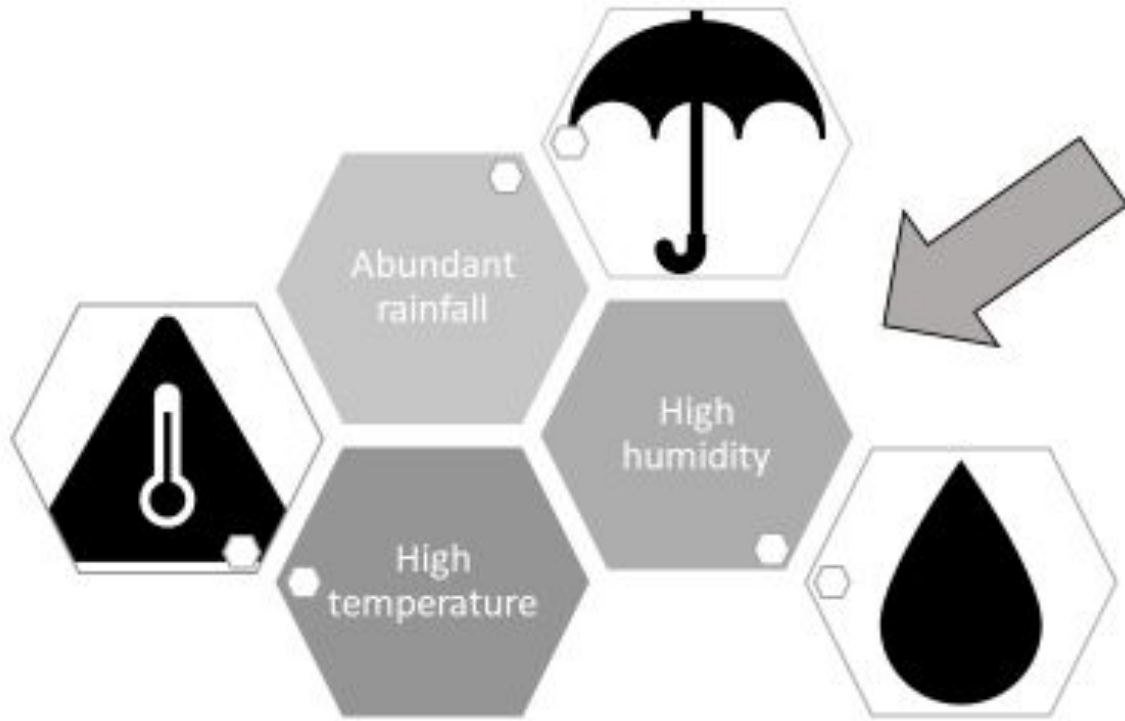
## How the answers help tourists plan

- Which time of the year is best to visit?
- Weather conditions tourists should look out for?
- Precautions that should be taken.
- Possible itineraries and attire in Singapore?



# Background

# Hot, humid tropical climate



## Monsoon

- Northeast Monsoon (Dec – early Mar)
- Southwest Monsoon (Jun – Sep)



## Sumatra squalls

- Line of thunderstorms
- Develops over Sumatra
- Moves over the Straits of Malacca



## Afternoon thunderstorms

- Surface heating
- Sea breeze circulation



# Urban heating & Climate change is intensifying Singapore's rising temperatures



Singapore warms up faster due to urban heat island effect

During April and May 2022, temperatures hit record highs of 36.8 degree Celsius



Temperature is expected to rise 1.5 deg C within the next five years (50 % probability)

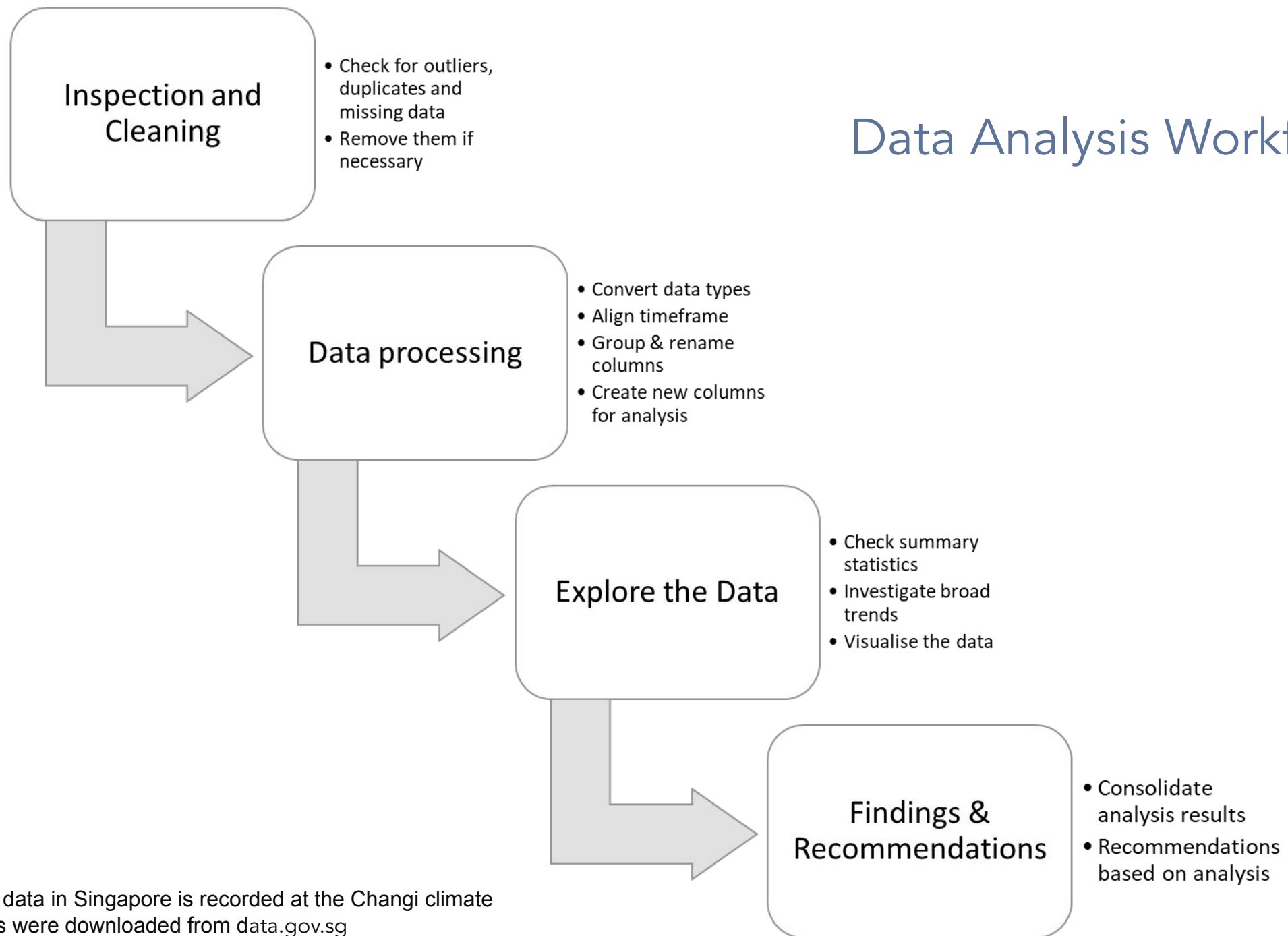


Urban heating & Climate change is intensifying Singapore's rising temperatures.

Tourists who are particular about temperature should be advised on when to come, based on statistics

# Datasets and Analysis Approach

# Data Analysis Workflow



Notes: Weather data in Singapore is recorded at the Changi climate station. Datasets were downloaded from [data.gov.sg](https://data.gov.sg)

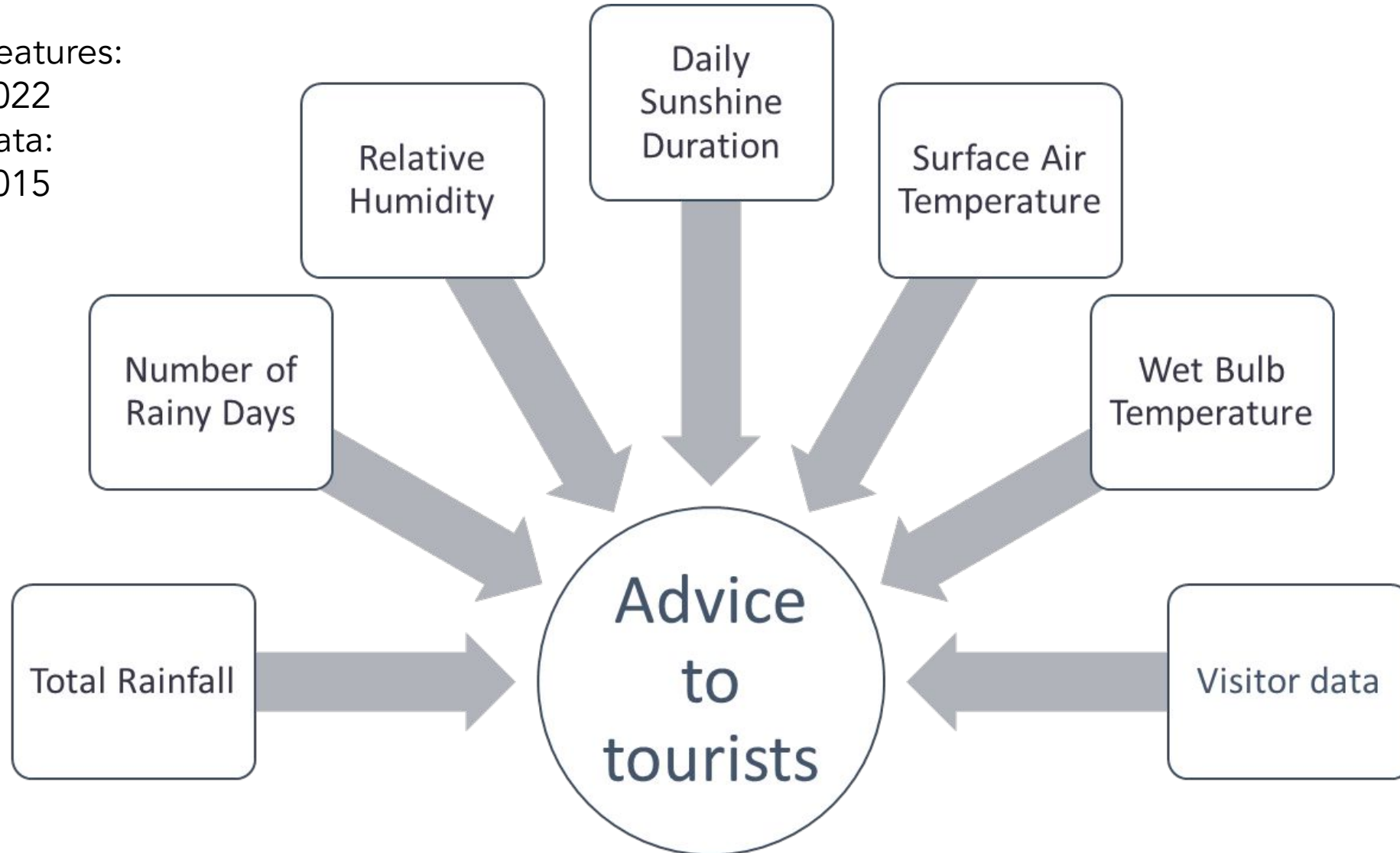
# Advice to tourists will be given based on analysis of data

Weather features:

1982 to 2022

Tourism data:

1978 to 2015

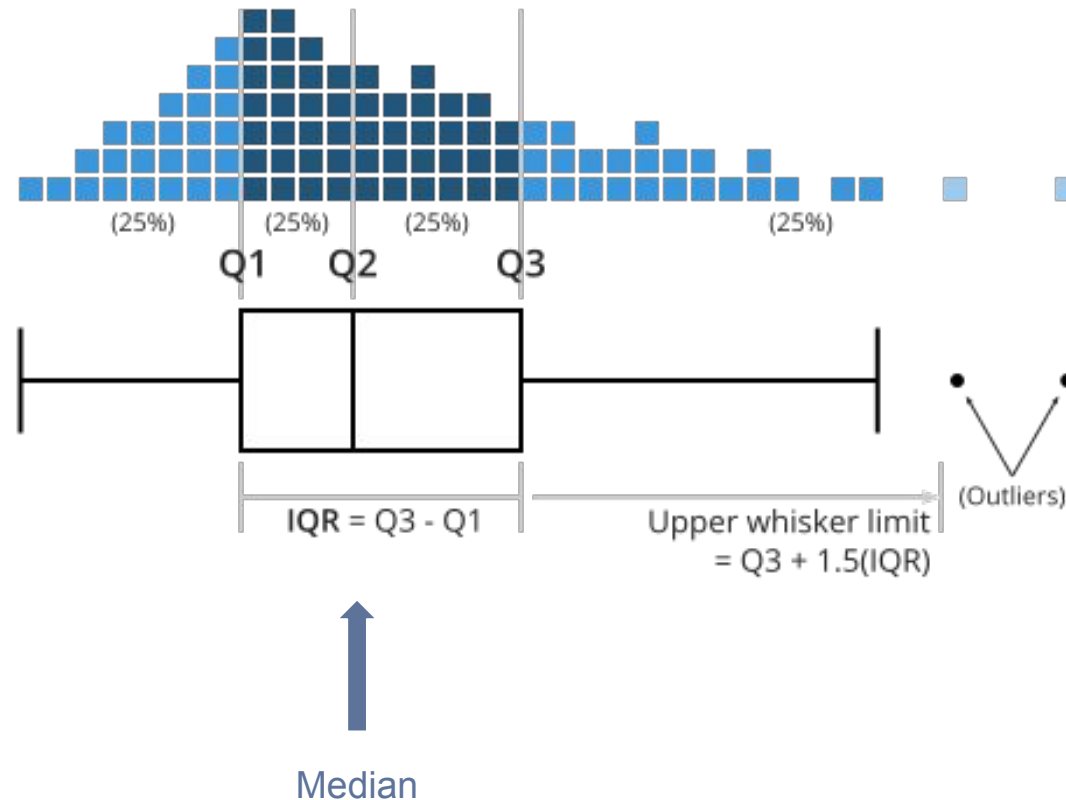


# Key Findings

But first....

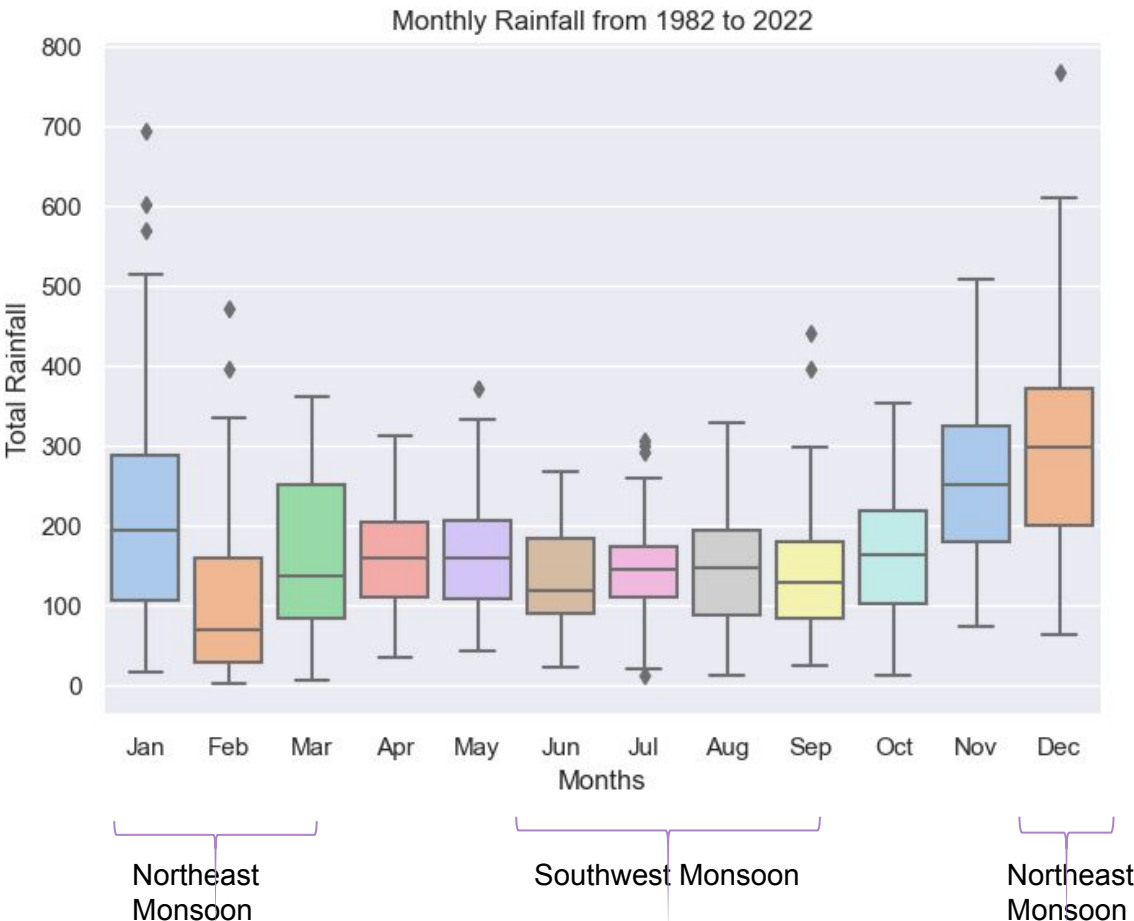
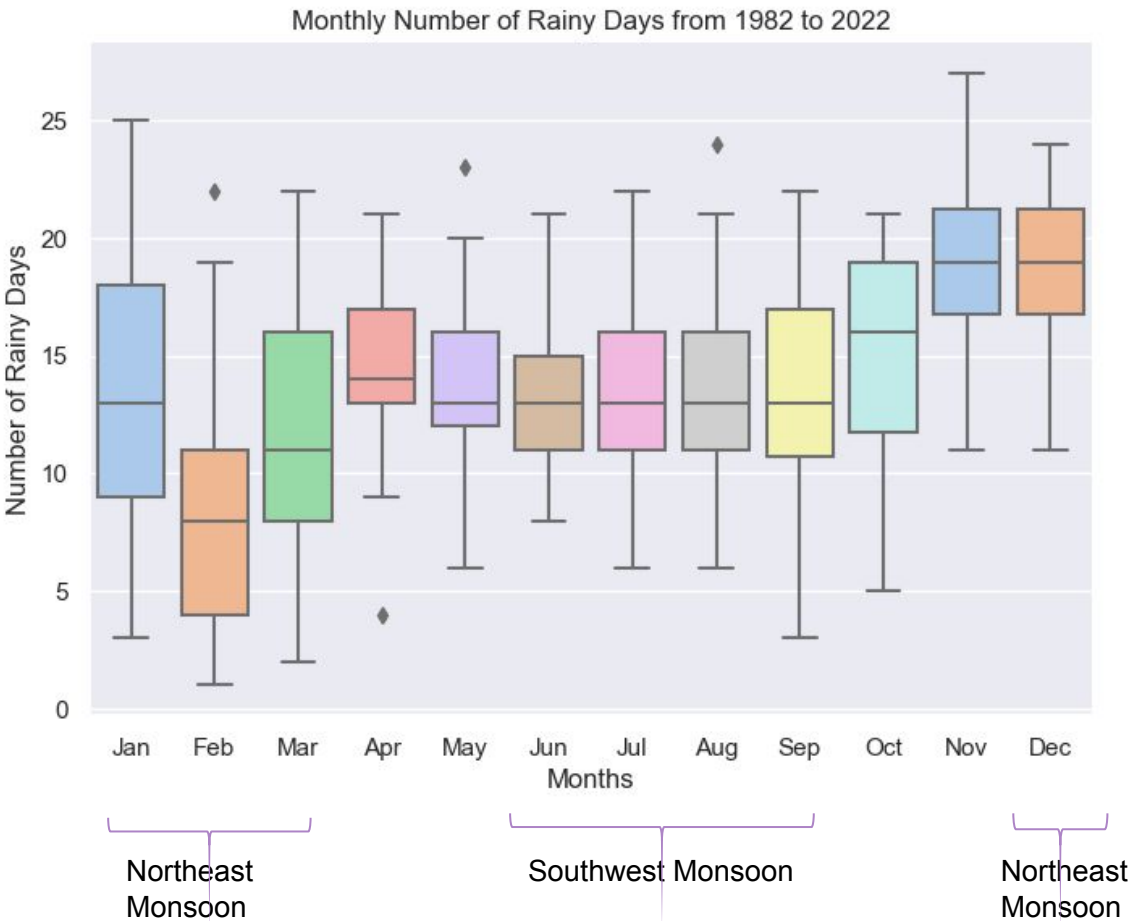
## How to read a boxplot, or a box-and-whisker plot

Boxplots show the distribution of our data, where 25% of data points fall into each box/whisker



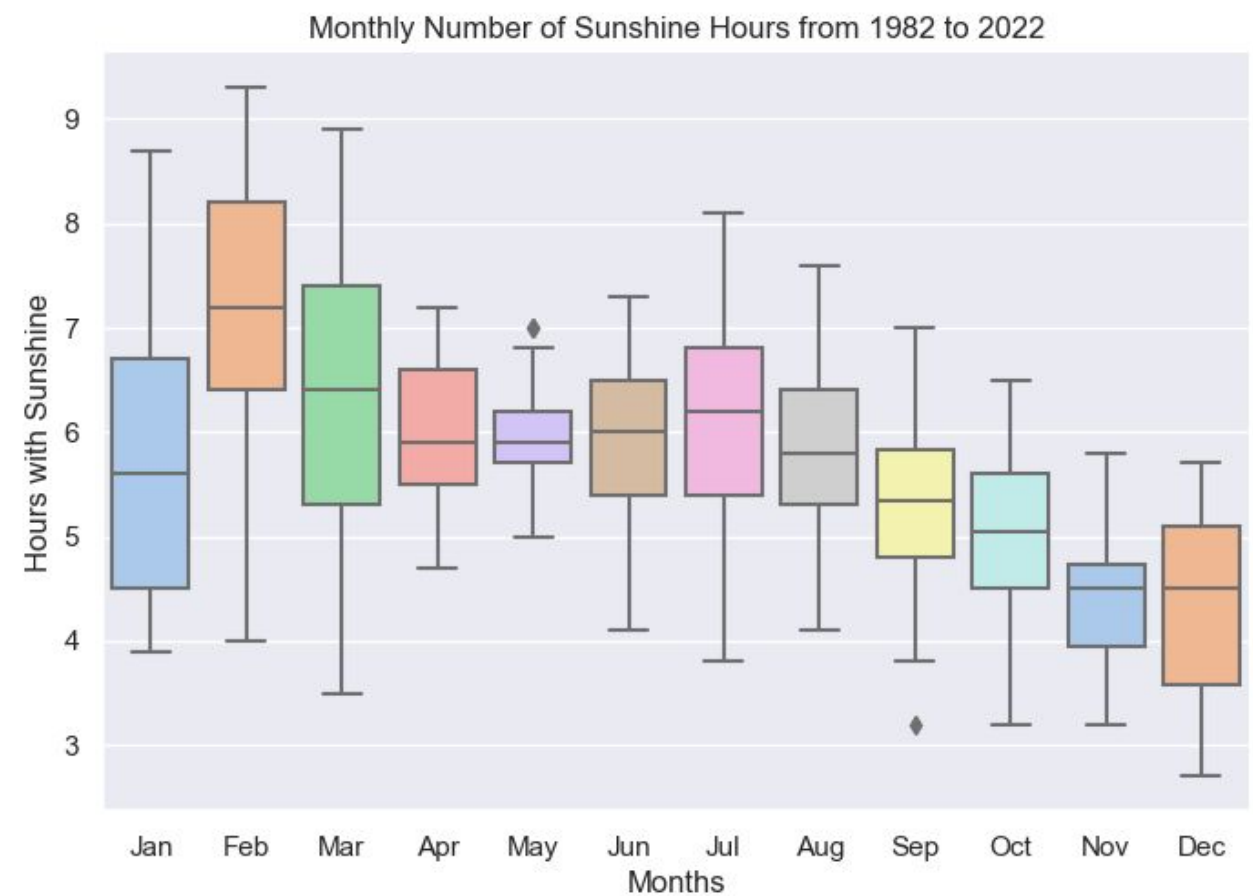
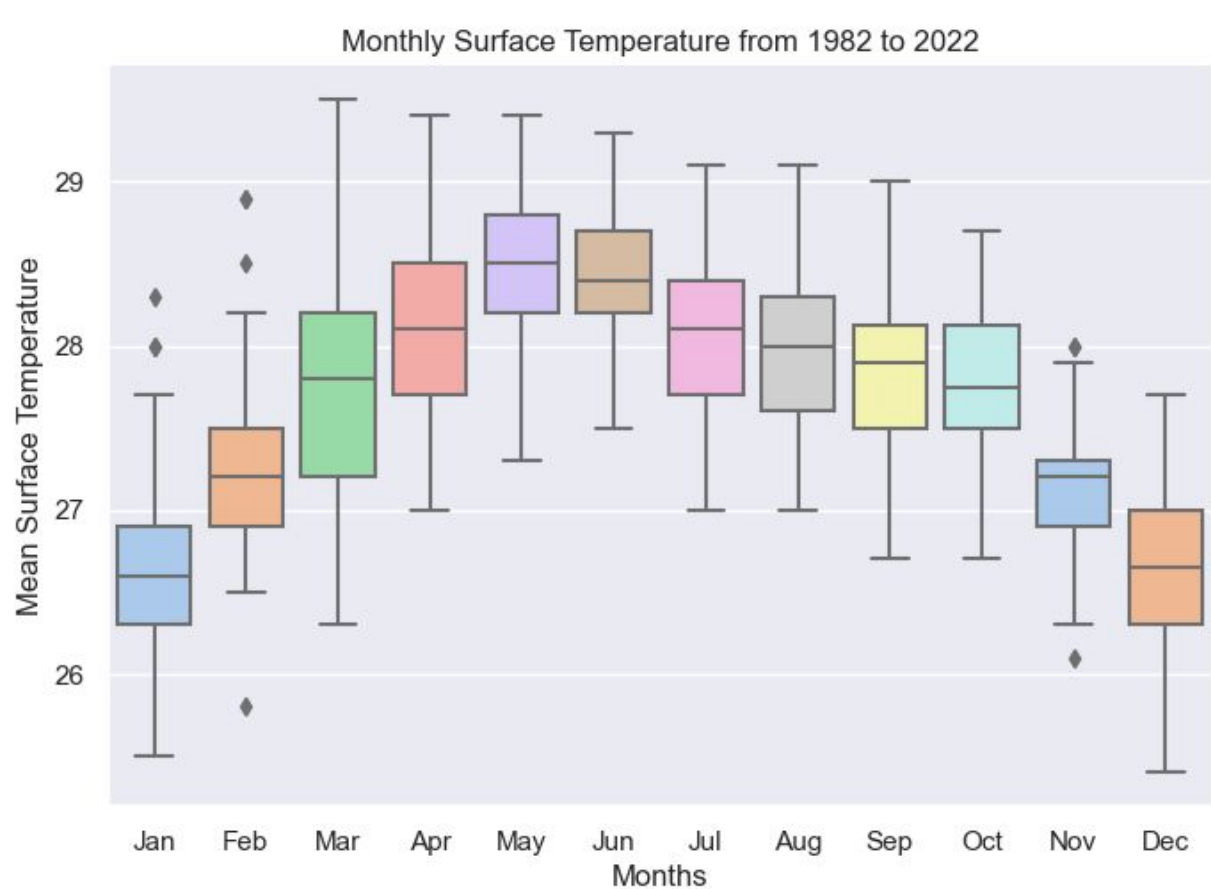
# Rain

In line with the monsoon seasons, Nov-Jan have the highest rainfall, while Feb-Mar and Sep-Oct tend to have more drier days.



Heat

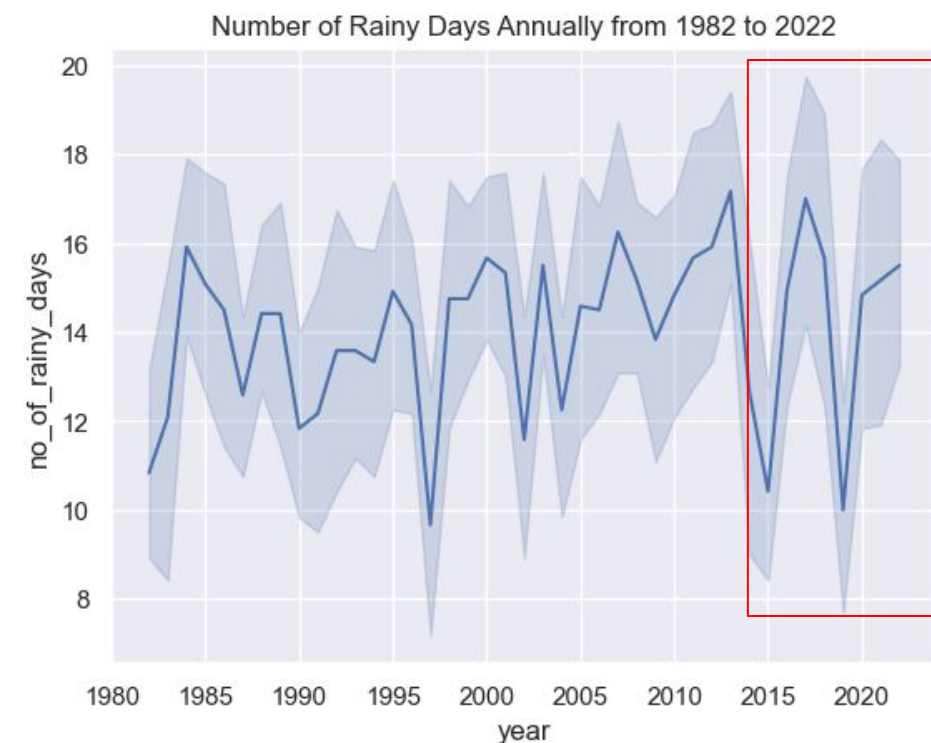
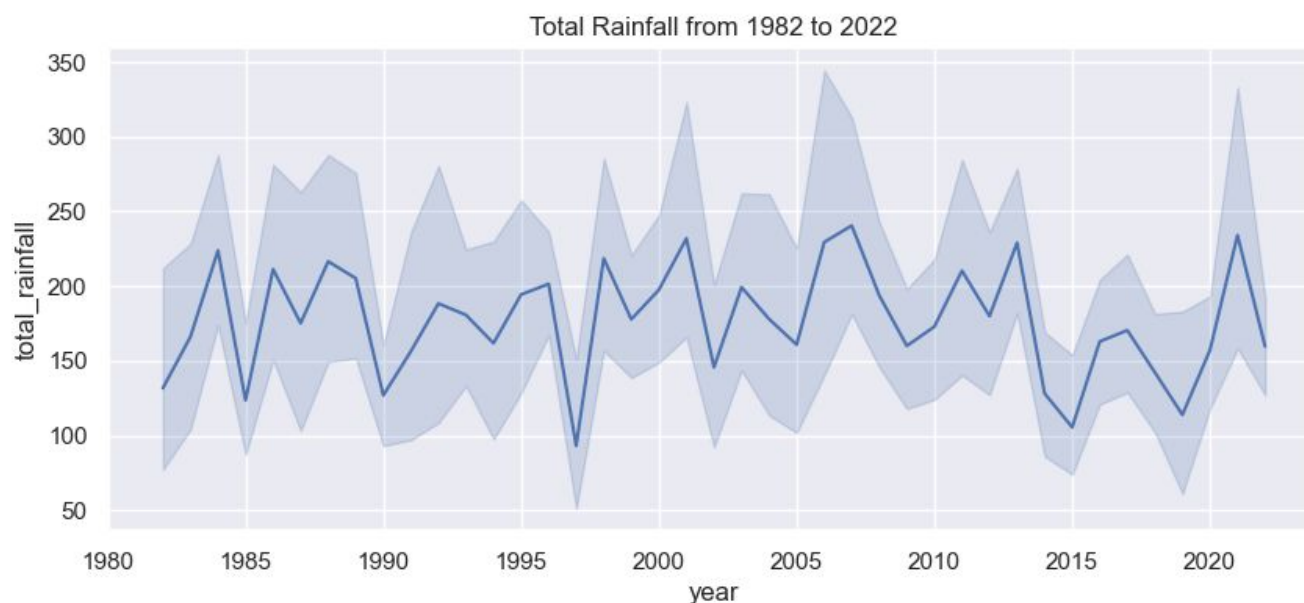
Surface temperatures are highest at mid-year from Apr to Jul, and lowest at the end of the year. In May, typically the warmest month, the median surface temperature is 28.5 degrees Celsius.





# Rain

Since the 1980s annual rainfall volume has stayed constant, but the variability in the number of rainy days increased since 2010.

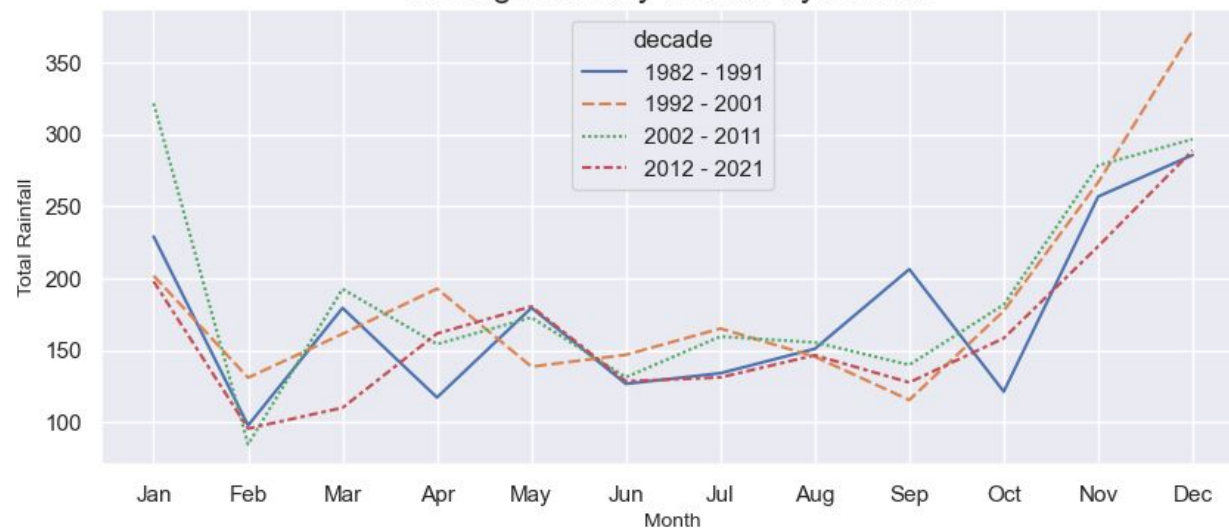


Singapore is experiencing more erratic rainfall patterns, with some years recording substantially lower rainfall and others higher.

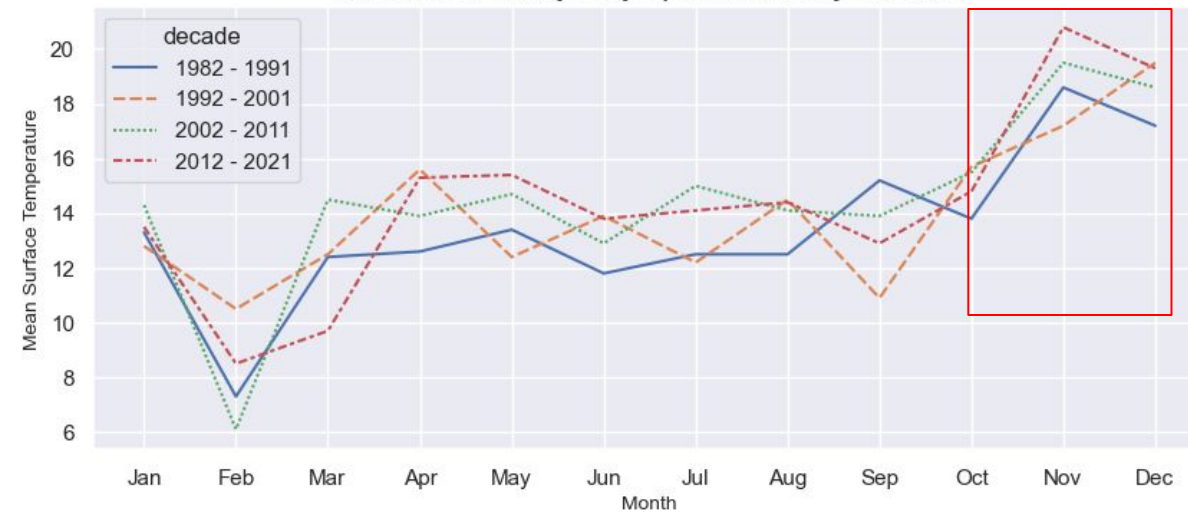
# Rain

## The number of rainy days from Oct-Dec has increased with each passing decade

Average Monthly Rainfall by Decade



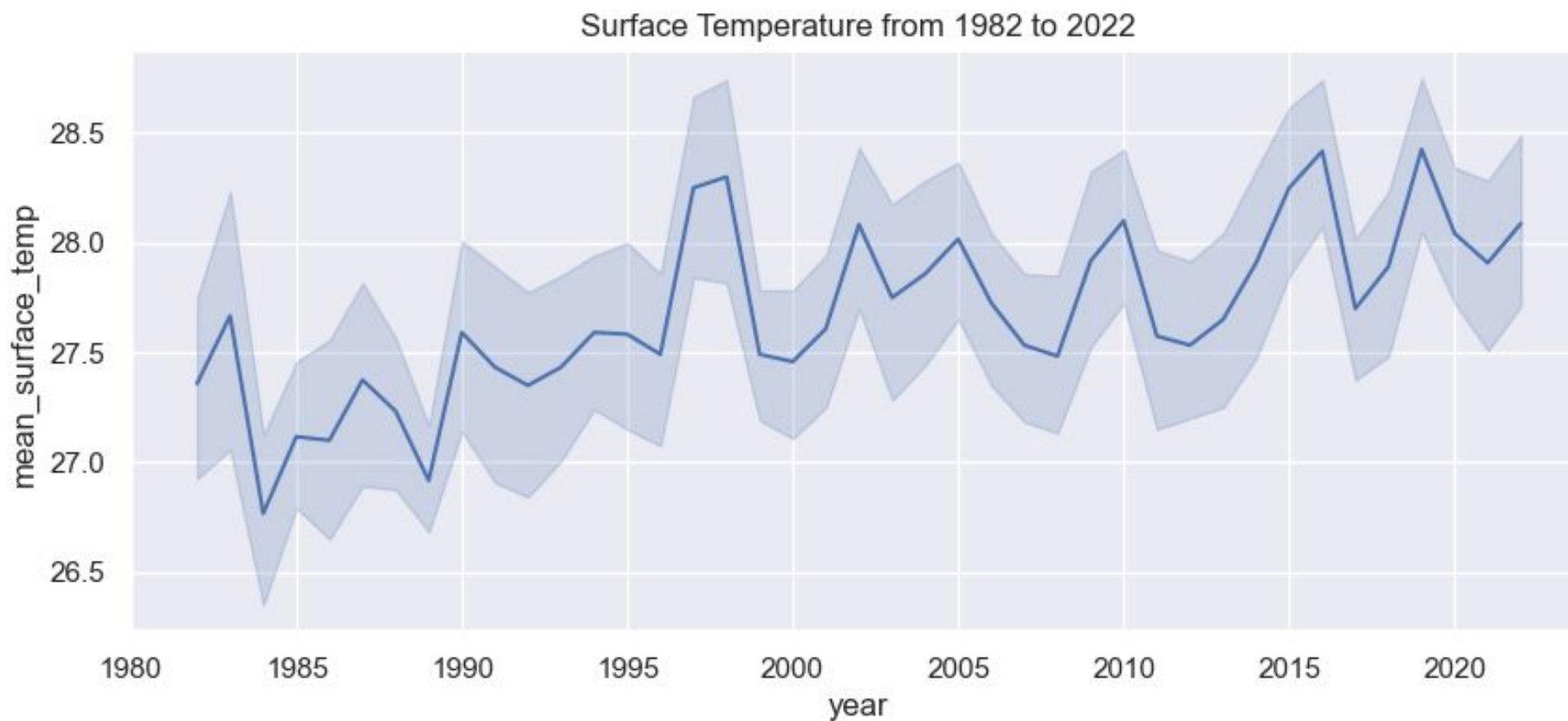
Number of Rainy Days per Month by Decade



A higher number of rainy days means fewer opportunities for a fun day out for tourists in the year-end months

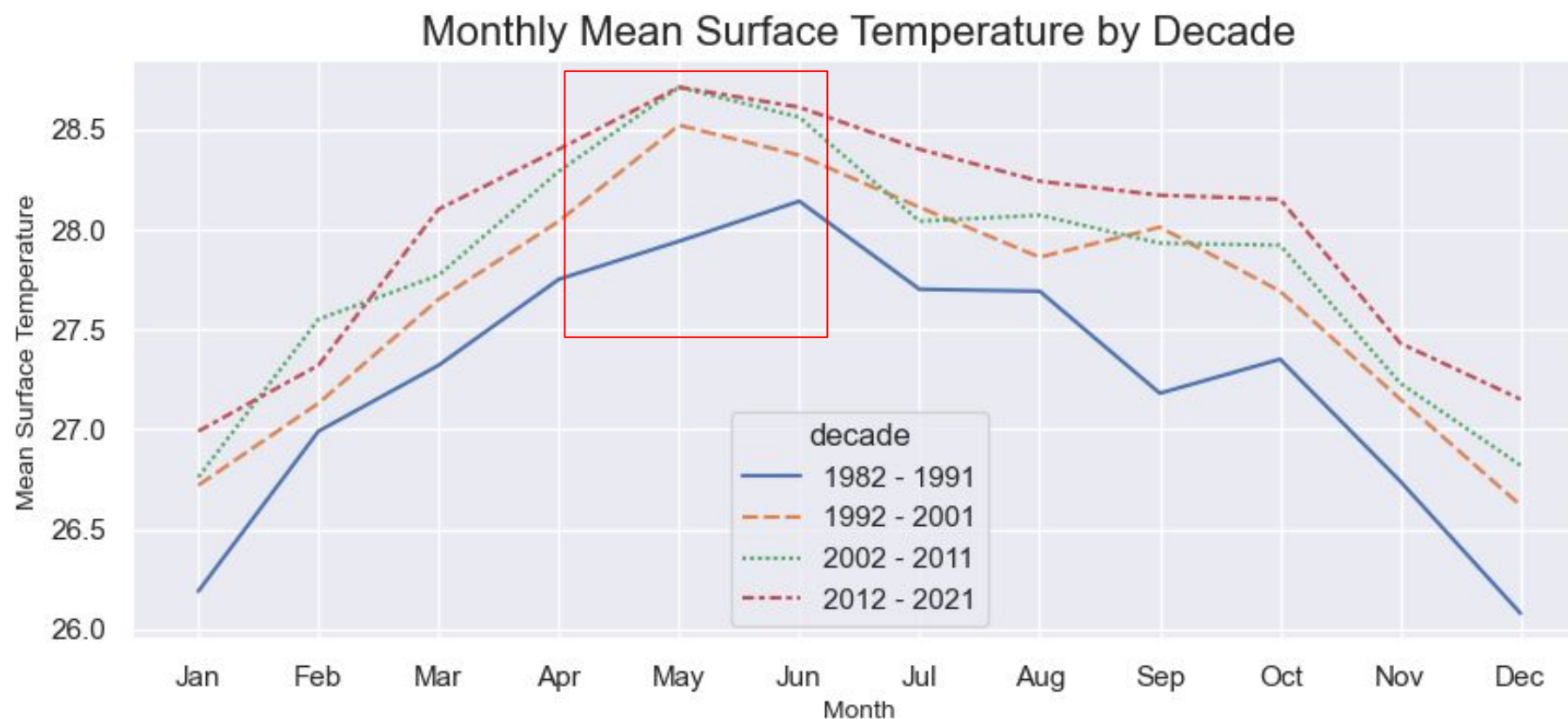
## Heat

### Clear upward trend in surface temperature over the last 40 years



# Heat

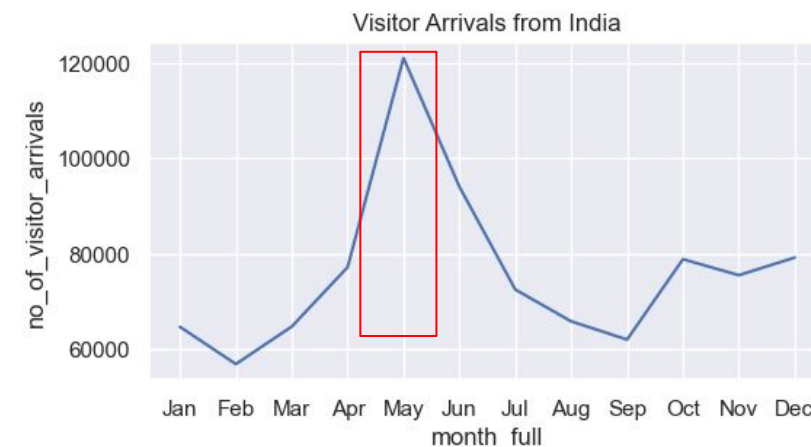
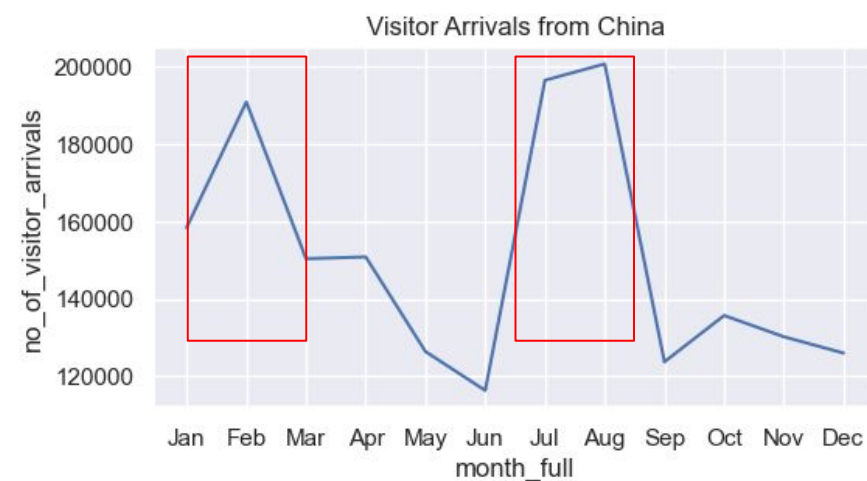
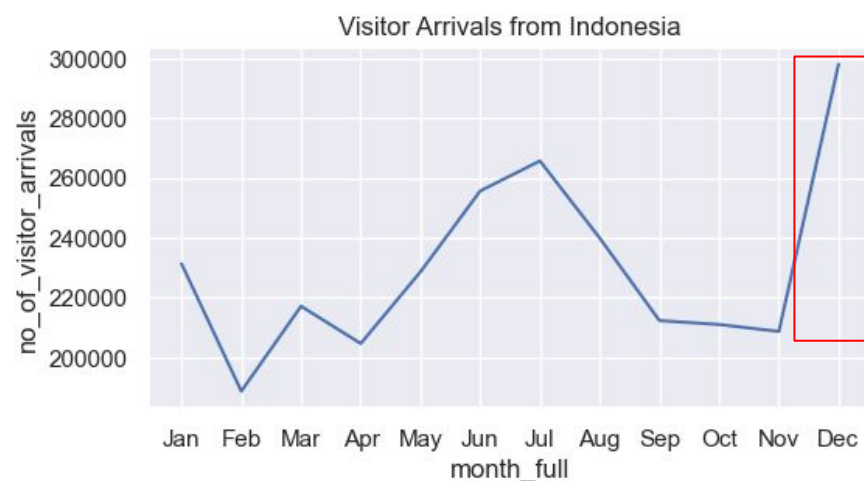
## The increase in surface temperatures is consistent across all months



Our warmest months are getting warmer:  
higher risk of heat-related stress on people spending time outdoors

# Tourism

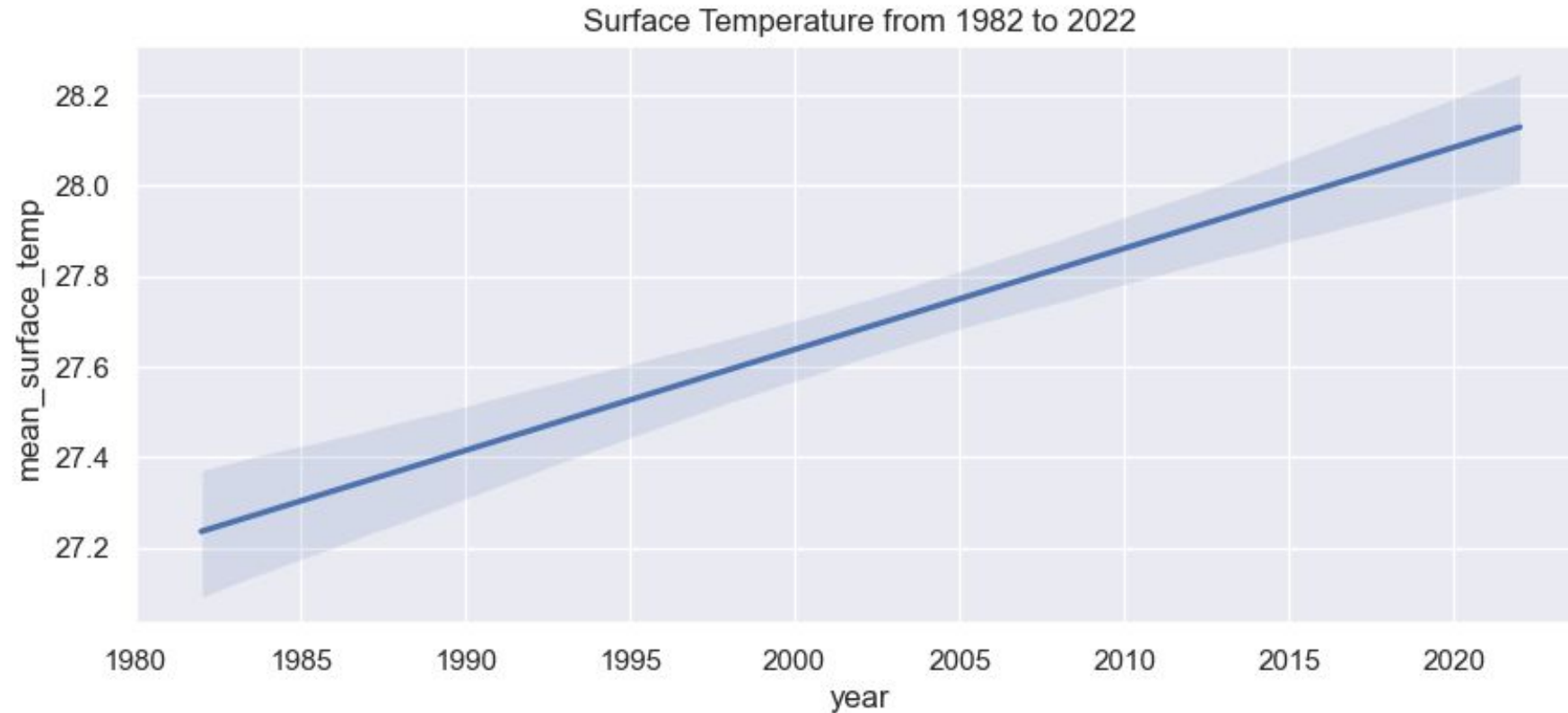
Top 5 countries of origin for tourists are Indonesia, China, Malaysia, Australia and India. Visitorship patterns vary by country.



# Recommendations



Q1. Since the 1980s to today, has Singapore gotten warmer and rainier?

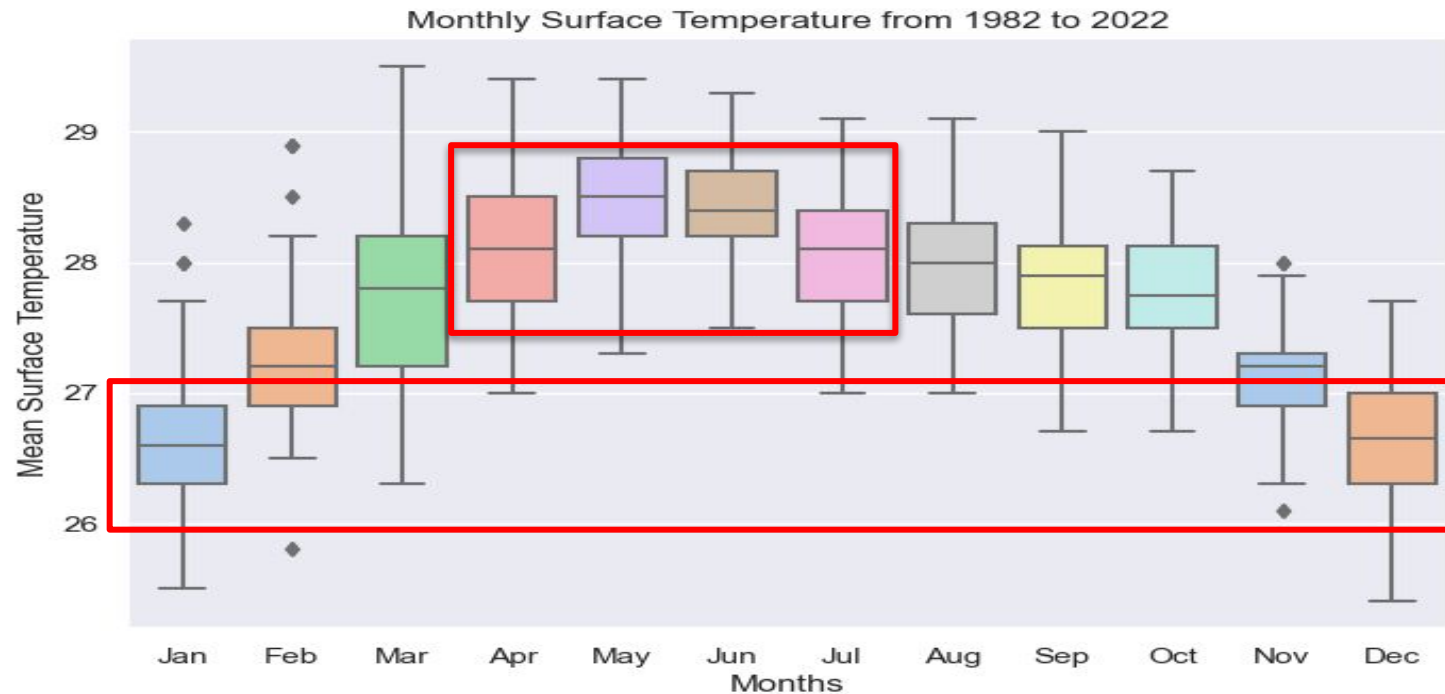


**Singapore has gotten warmer over the years.**



*Provide education about the dangers of spending too much time outdoors.*

Q1. Since the 1980s to today, has Singapore gotten warmer and rainier?



**Warmest Months: Apr - Jul**  
**Coolest Months: Dec - Jan**



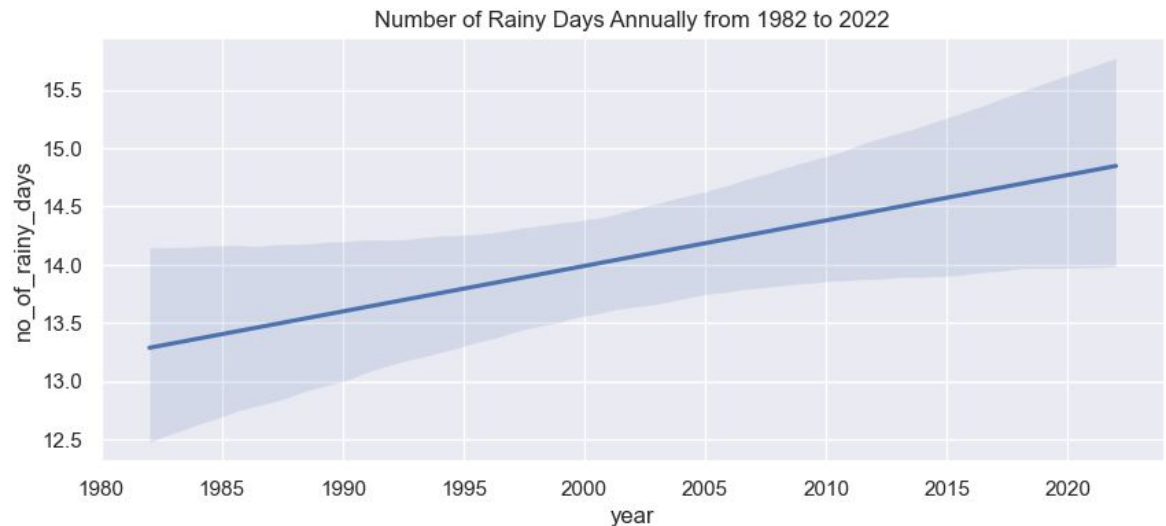
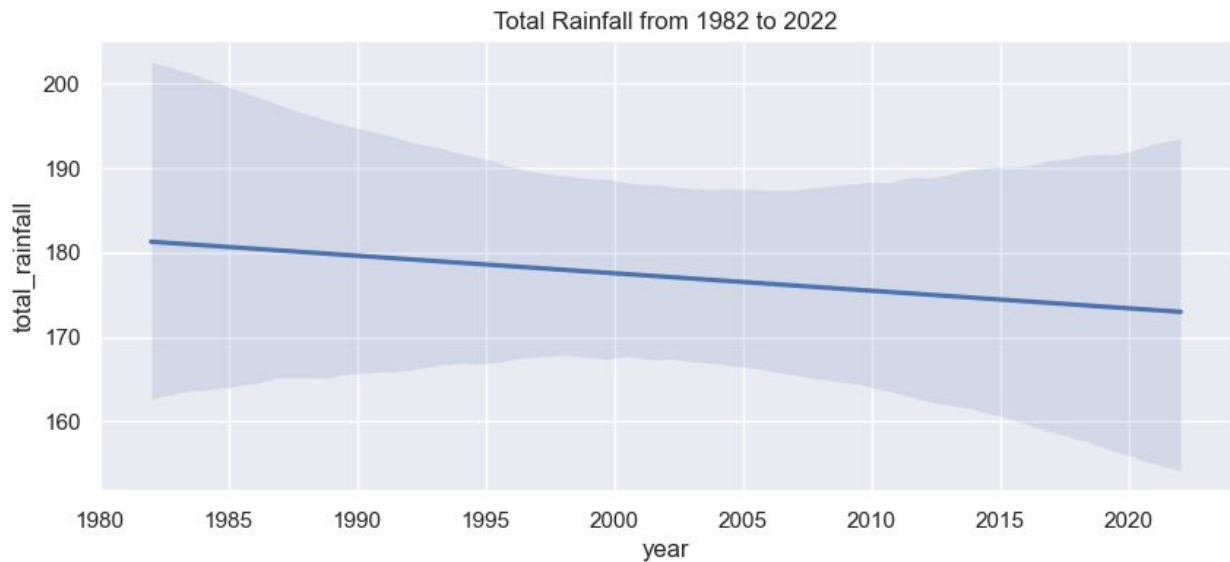
*Increase awareness for outdoor activities for Apr - Jun*



*Recommend Dec - Jan for coolest weather*

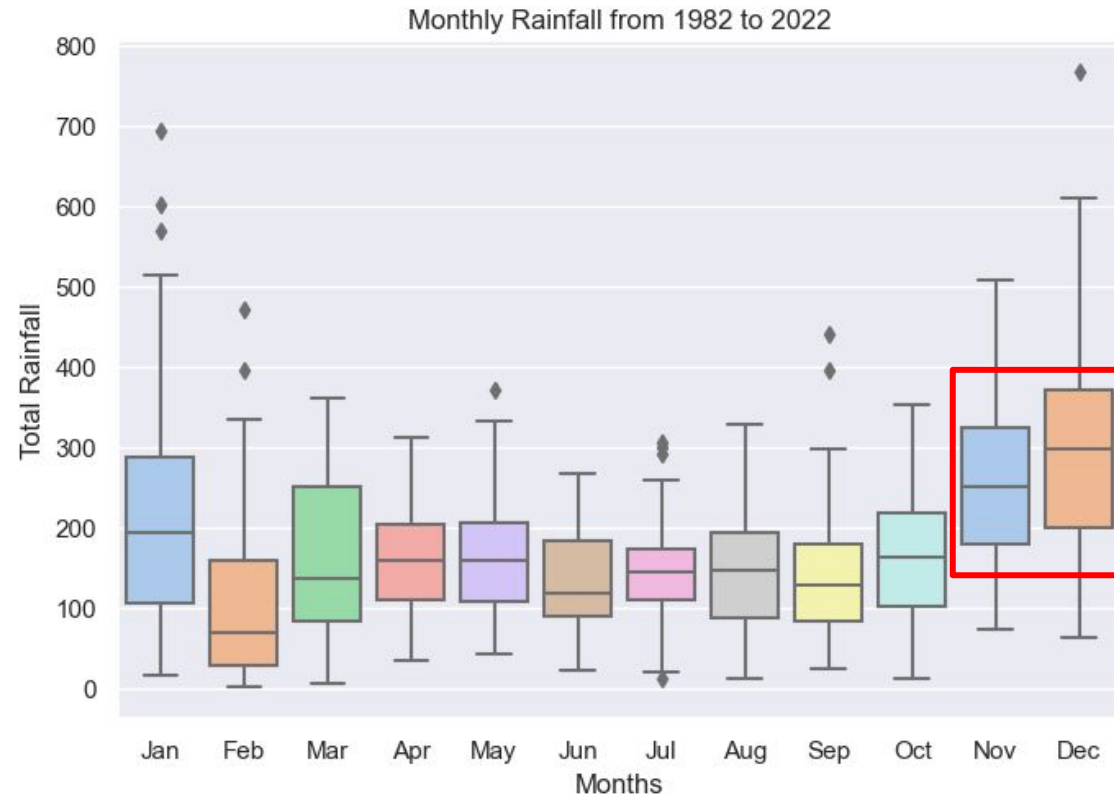


Q1. Since the 1980s to today, has Singapore gotten warmer and rainier?



Not rainier

Q1. Since the 1980s to today, has Singapore gotten warmer and rainier?

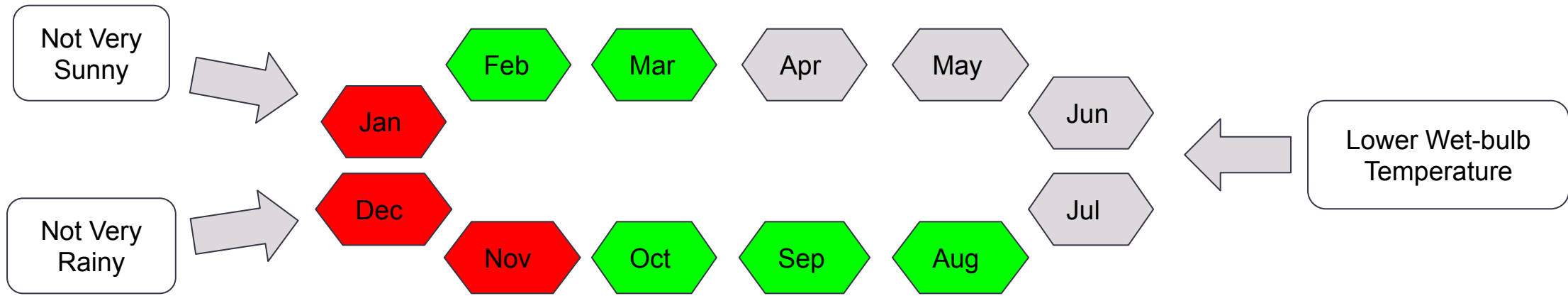


More rain between Nov - Dec



*Caution wet weather for the year end*

## Q2. Which months are best for outdoor activities?



**Feb- Mar & Aug-Oct are best for outdoor activities**



*Recommend Feb - Mar & Aug-Oct for outdoors activities*



*Caution Nov - Jan due to rainy season*

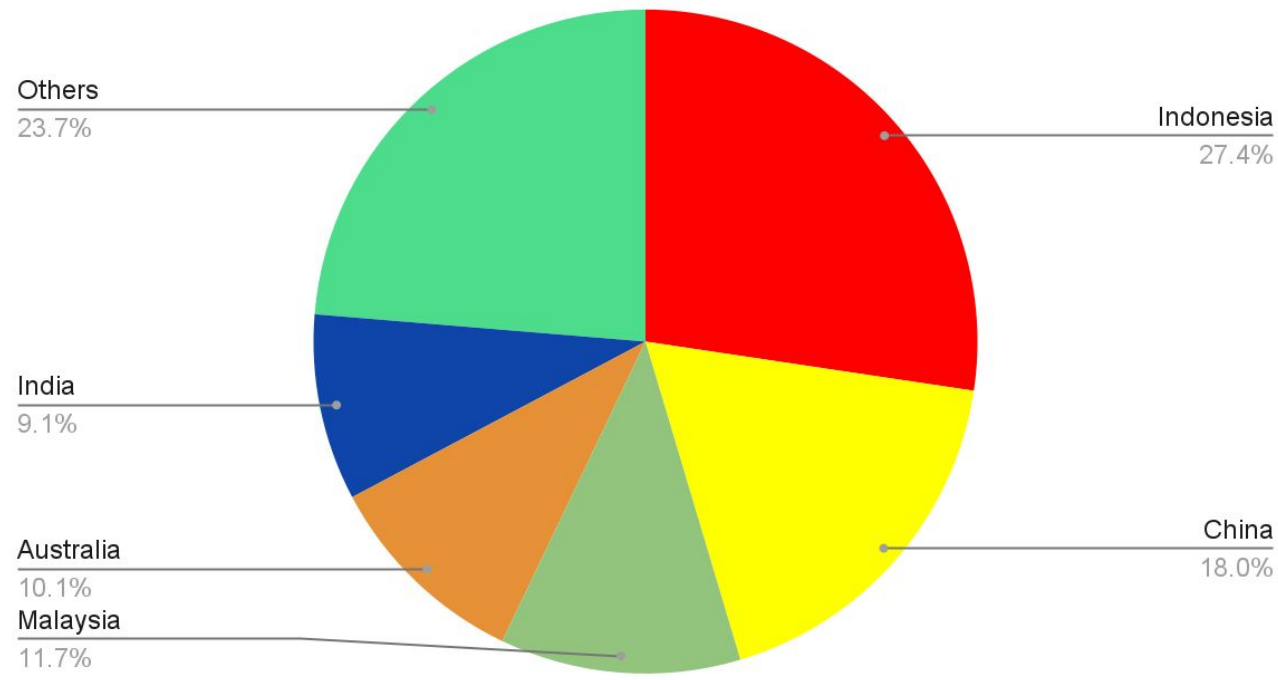
### Q3. What does this mean for tourists looking for a fun day out in Singapore?

- ✓ *Time trips between Feb - Mar or Aug - Oct for ideal outdoors weather*
- ✓ *Due to humidity, wear light and breathable cloths*
- ✓ *Bring a hat and use sunblock*
- ✓ *Hot weather between Apr - Jul: Hydrate frequently, avoid long strenuous outdoor activities, take regular breaks*
- ✓ *Wet weather between Nov - Jan: Pack umbrellas, ponchos, indoor activities*

# Additional Insights & Future Considerations

# Visitorship Data

Visitorship Data



**75% of visitors come from 5 countries**



*Have a dedicated webpage with information specific to these countries*

*Tailored recommendations for what to pack, activities, attractions*

*Send customized email plans before peak visitorship*

## For Future Consideration



*Analyze motivation for specific country peak period*



*Recommend specific activities based on tourist motivations*



*Resource planning for activities to cater tourist profile*

# Australia Example



- ✓ Jan (Summer school holidays): Cater child/family friendly activities + Christmas shopping
- ✓ July ( Winter & school holidays): Cater child/family friendly activities and outdoor activities
- 🔍 Sep: No obvious insight. Requires further analysis



Questions?