

# DSI 35 Project 1: Singapore Rainfall Data

Benedict Ong

# Context

Extreme Weather in Singapore  
and  
CO<sub>2</sub> Emission Levels

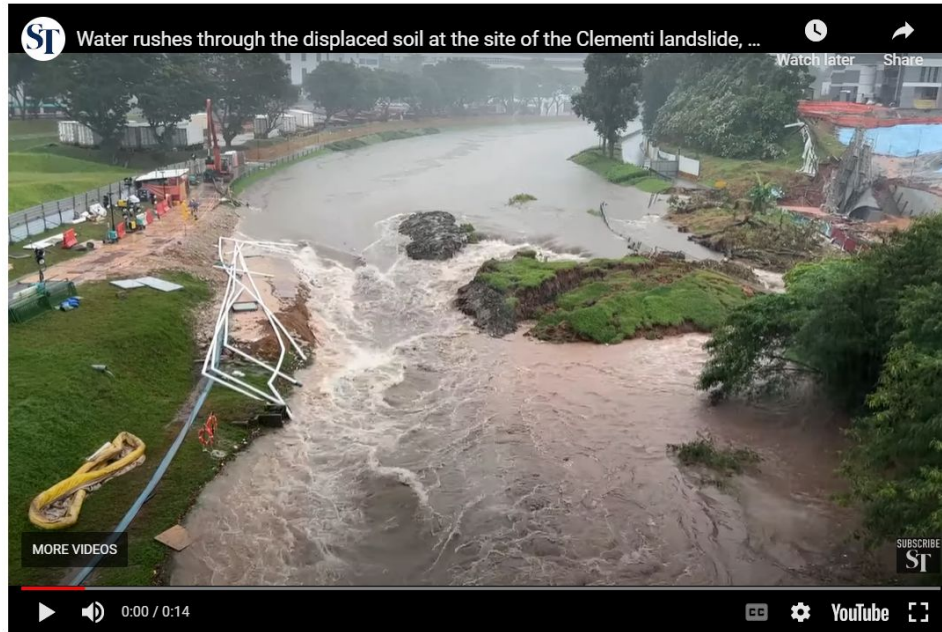
# Extreme Weather in Singapore: Floods



The Straits Times  
19 January 1987

# Extreme Weather in Singapore: Floods

Sections of Ulu Pandan Park Connector  
briefly closed after flash flood warning



The Straits Times  
18 September 2022

# Extreme Weather in Singapore: Dry Spells

## Haze hits levels not seen since 1997 record



BY ALFRED CHUA

BY LOW JEN THYE KENNETH

Published June 18, 2013

Updated April 12, 2021



Today  
18 June 2013

Haze over Singapore, view from Upper Thomson Road on June 17, 2013. Photo: Ernest Chua.

# Extreme Weather in Singapore: Dry Spells

Singapore experiencing record dry spell  
- and it could get worse: NEA



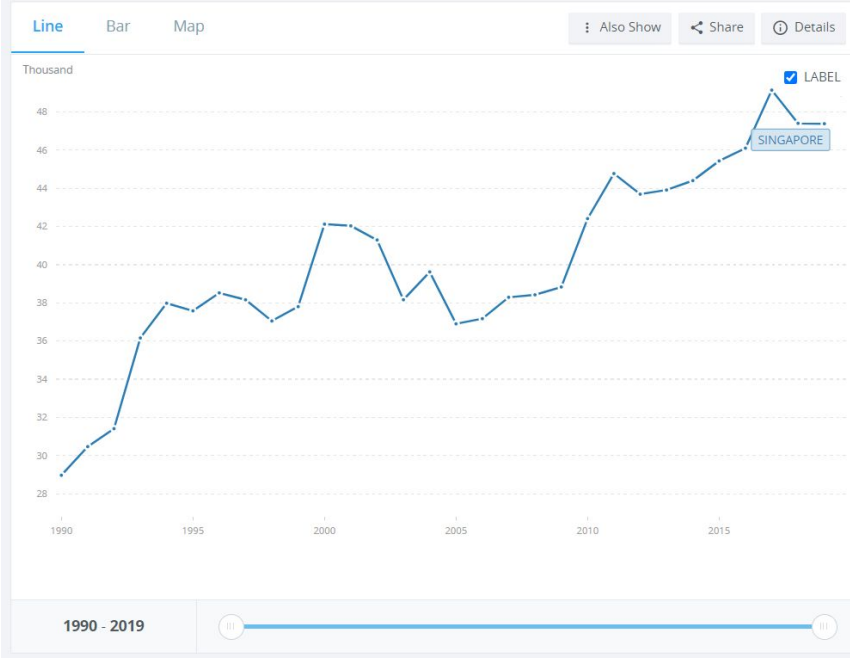
Today  
25 February 2014

# Singapore CO<sub>2</sub> emissions in kilotonnes

## CO2 emissions (kt) - Singapore

Climate Watch. 2020. GHG Emissions. Washington, DC: World Resources Institute. Available at: [climatewatchdata.org/ghg-emissions](https://climatewatchdata.org/ghg-emissions).

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World Bank Data

1990 to 2019

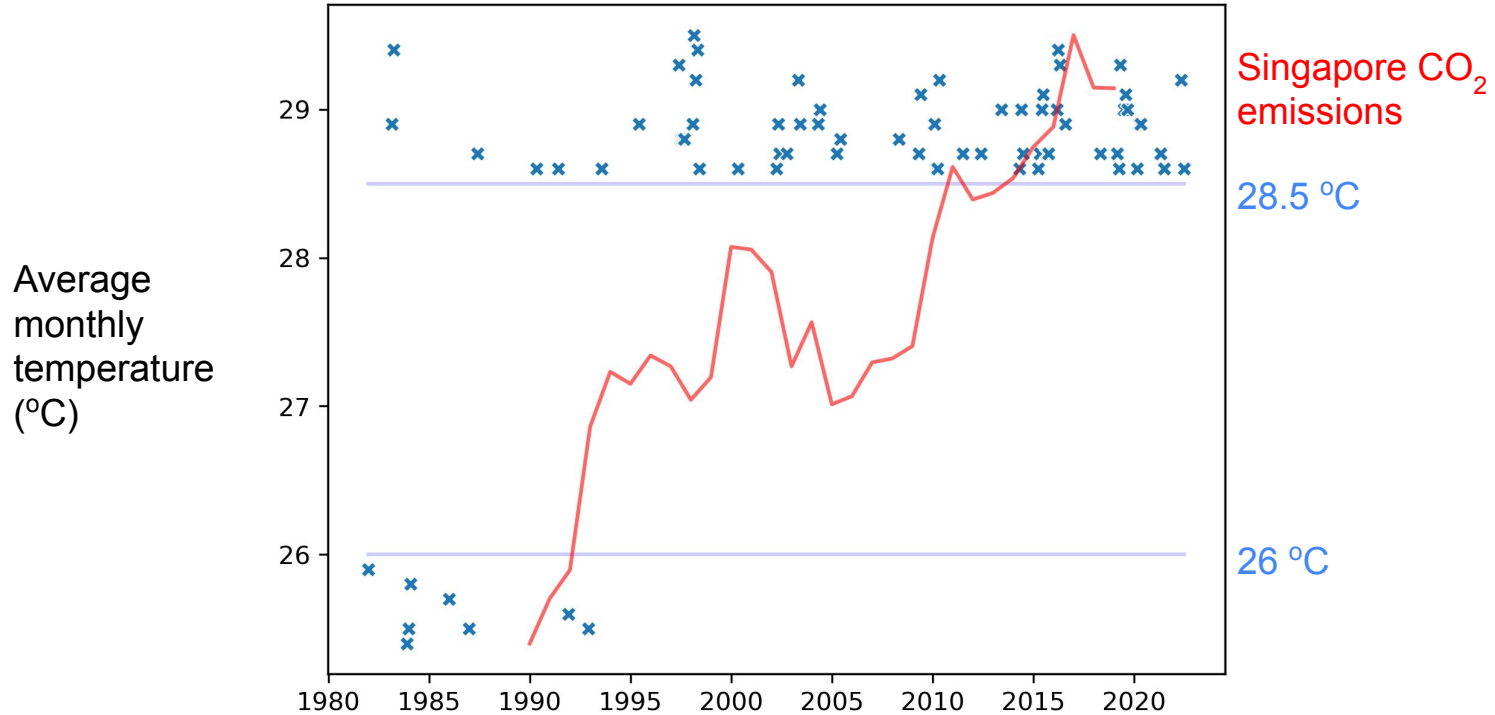
# Problem Statement

The NEA communications arm has decided to attribute Singapore's extreme weather events to CO<sub>2</sub> emissions.

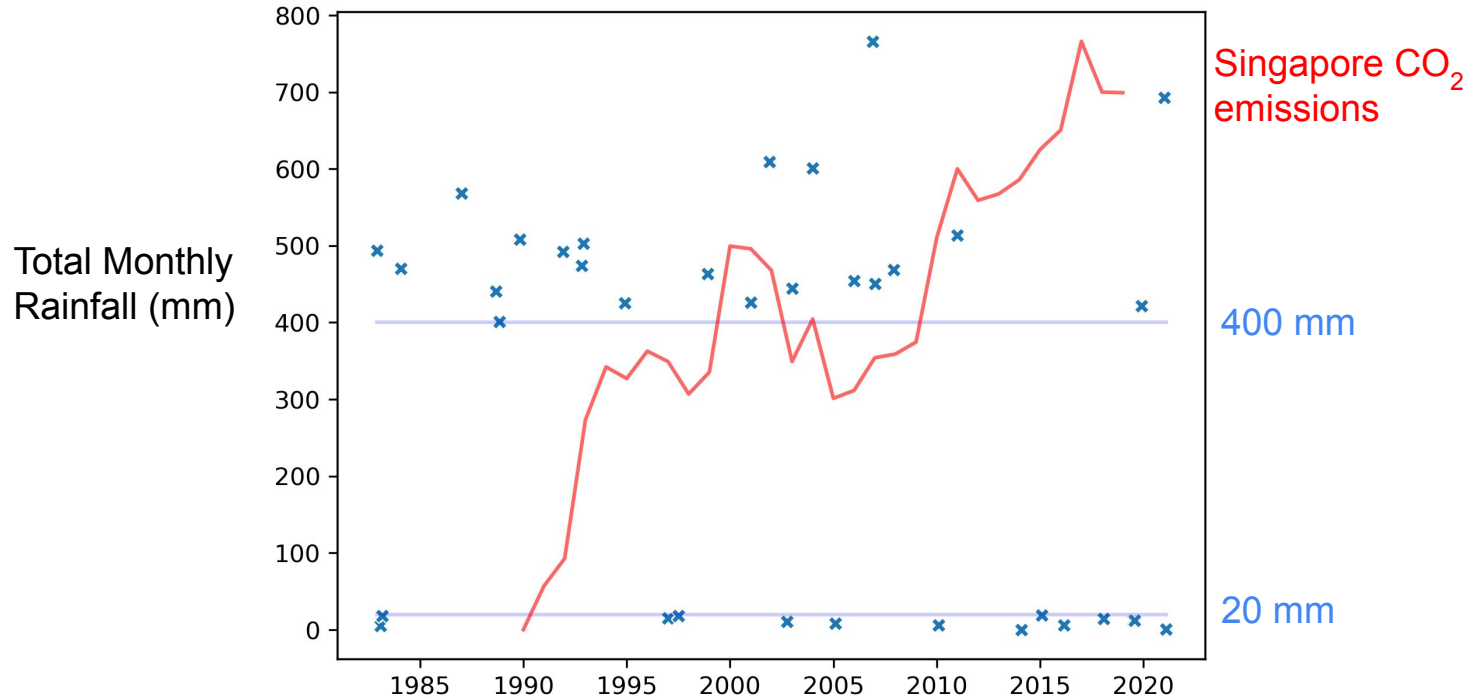
They have hired me from fiverr.com to recommend the data and visualizations to show how increasing CO<sub>2</sub> emissions is changing Singapore's weather.



# More extremely hot days

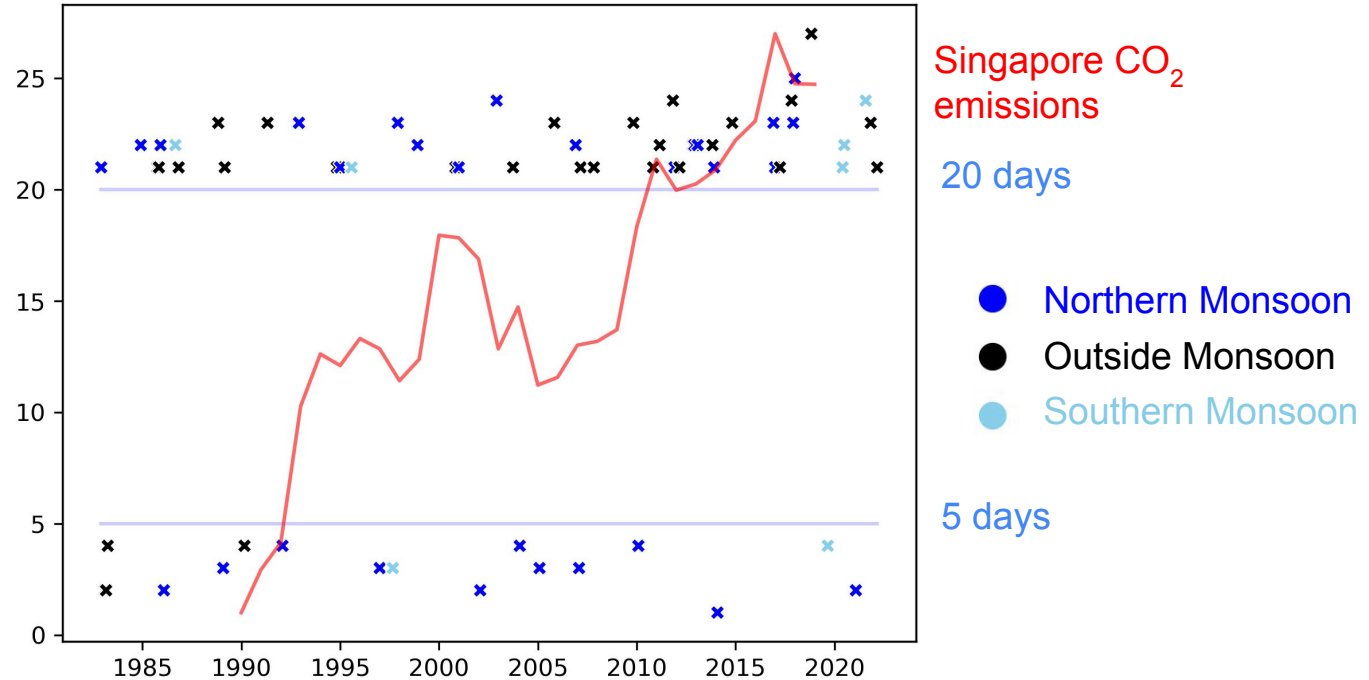


# More dry spells and more extreme rainfall



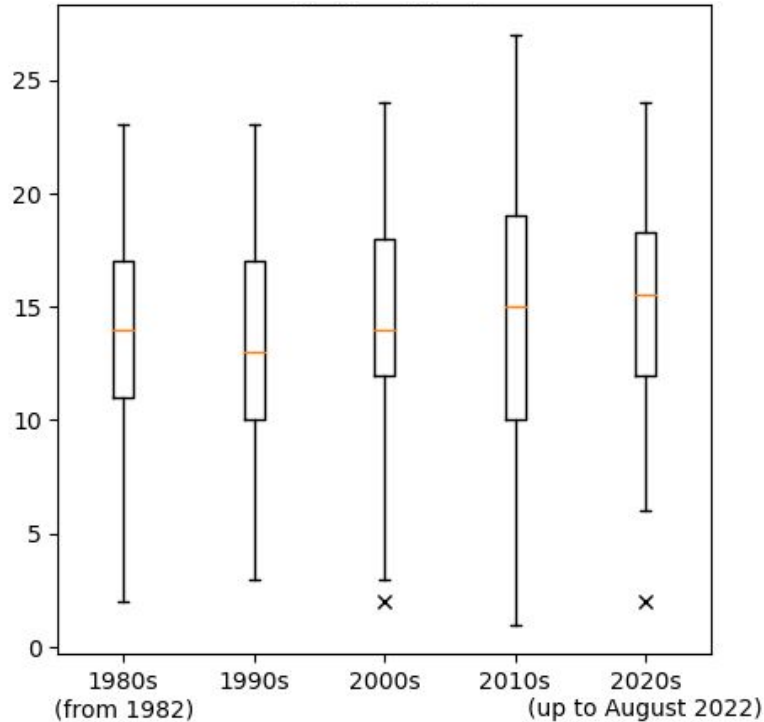
# More rainy months outside the monsoon

Monthly  
number of  
rainy days



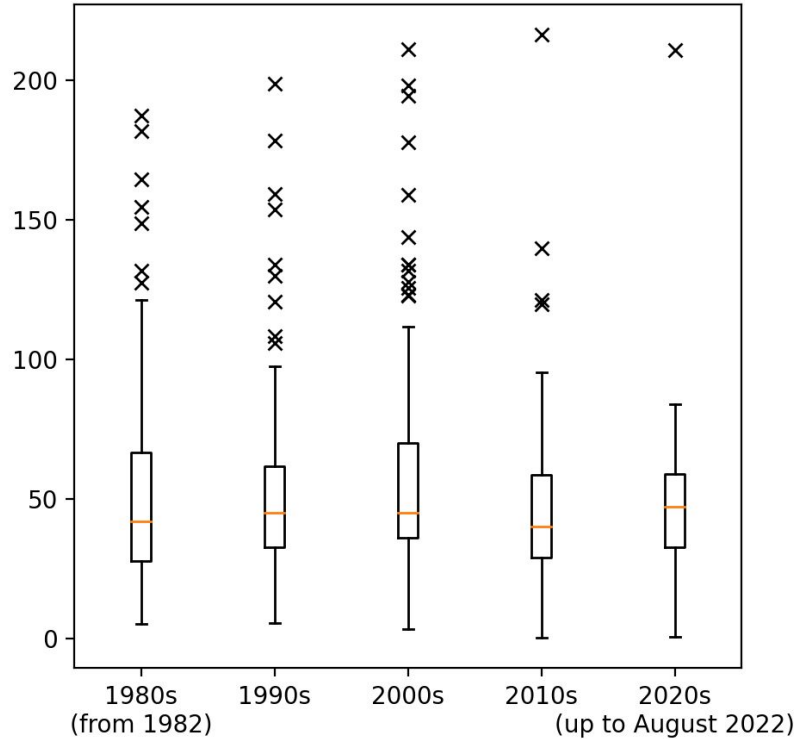
# Increasing variation of rainy days between months

Rainy days in  
a month



# Heavier rains in a day

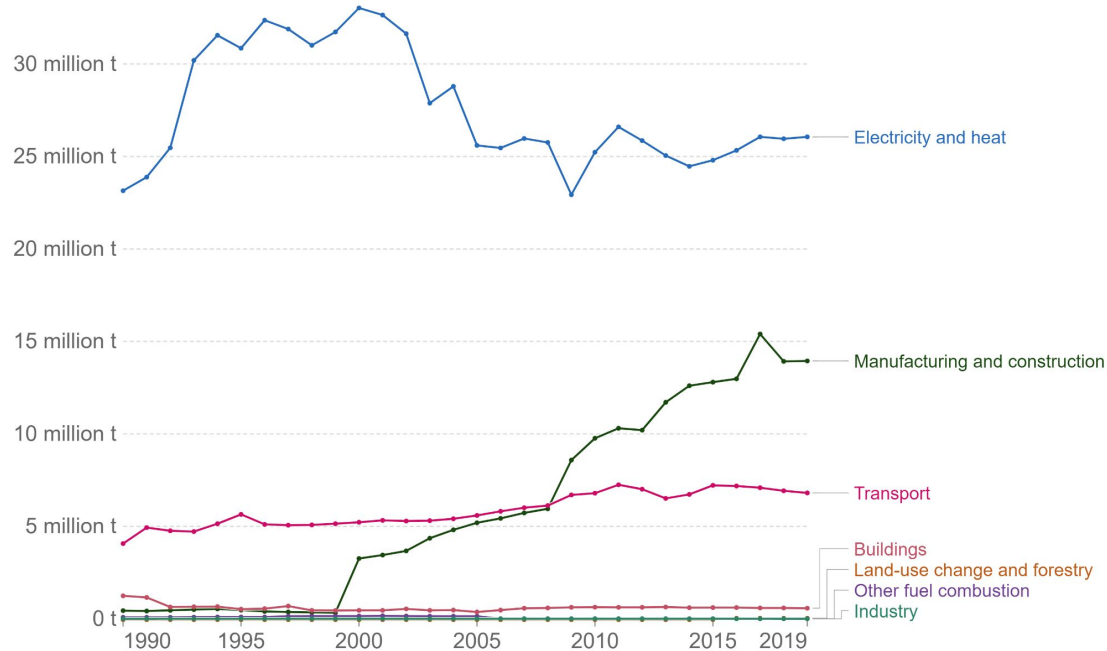
Monthly  
maximum  
rainfall in a day  
(mm)



# More efficient use of electricity needs encouraged

CO<sub>2</sub> emissions by sector, Singapore

Our World  
in Data



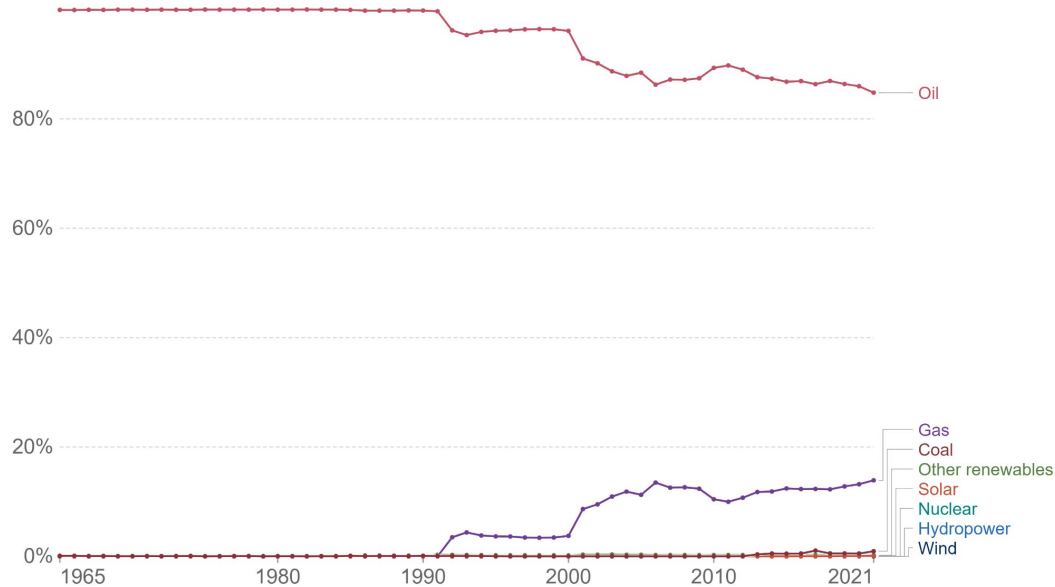
Source: Our World in Data based on Climate Analysis Indicators Tool (CAIT). [OurWorldInData.org/co2-and-greenhouse-gas-emissions](https://OurWorldInData.org/co2-and-greenhouse-gas-emissions) • CC BY

# Continue reducing oil, increase more renewables

## Share of energy consumption by source, Singapore

To convert from primary direct energy consumption, an inefficiency factor has been applied for fossil fuels (i.e. the 'substitution method').

Our World  
in Data



Source: Our World in Data based on BP Statistical Review of World Energy (2022)

OurWorldInData.org/energy • CC BY

# Recommendations

- Use data and visualizations on temperature, total rainfall and max. rainfall
- Focus on energy efficiency
- More efforts into promoting green/renewable energy