Weather Comparison Across Australian Cities

Siddhi Jadhav   Sanch Anand   Thi Lan Anh Tran

Problem Introduction

- This report compares weather characteristics across ten Australian cities.
- The dataset includes over 10 years of weather observations.
- Objective: Compare key weather variables across cities to uncover climate patterns and implications.Key variables of interest are temperature, rainfall, humidity, and pressure.
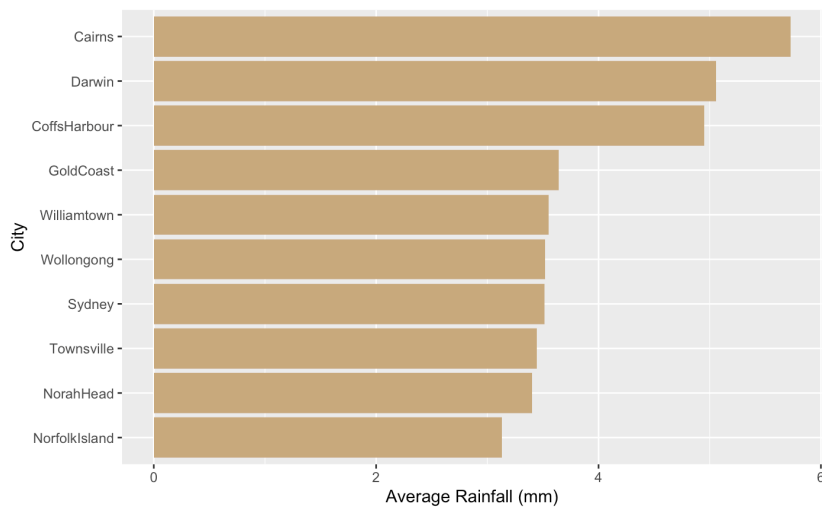

Dataset Description

- *Source*: Rattle Weather Dataset on Kaggle

- *Coverage*: 2008–2017 (~10 years)

- *Stations*: 49 Australian cities

- *Variables*:

    - Rainfall, Temp3pm, Humidity3pm

    - Pressure9am, RainToday, RainTomorrow

    - Metadata: Date, Location

	Date	Location	MinTemp	MaxTemp	Rainfall	WindGustSpeed	WindSpeed9am	WindSpeed3pm	Humidity9am	Humidity3pm
1	2008-12-01	Albury	13.4	22.9	0.6	44	20	24	71	22
2	2008-12-02	Albury	7.4	25.1	0.0	44	4	22	44	25
3	2008-12-03	Albury	12.9	25.7	0.0	46	19	26	38	30
4	2008-12-04	Albury	9.2	28.0	0.0	24	11	9	45	16
5	2008-12-05	Albury	17.5	32.3	1.0	41	7	20	82	33
6	2008-12-06	Albury	14.6	29.7	0.2	56	19	24	55	23
7	2008-12-07	Albury	14.3	25.0	0.0	50	20	24	49	19
8	2008-12-08	Albury	7.7	26.7	0.0	35	6	17	48	19
9	2008-12-09	Albury	9.7	31.9	0.0	80	7	28	42	9
10	2008-12-10	Albury	13.1	30.1	1.4	28	15	11	58	27
11	2008-12-11	Albury	13.4	30.4	0.0	30	17	6	48	22
12	2008-12-12	Albury	15.9	21.7	2.2	31	15	13	89	91
13	2008-12-13	Albury	15.9	18.6	15.6	61	28	28	76	93
14	2008-12-14	Albury	12.6	21.0	3.6	44	24	20	65	43
15	2008-12-17	Albury	14.1	20.9	0.0	22	11	9	69	82
16	2008-12-18	Albury	13.5	22.9	16.8	63	6	20	80	65
17	2008-12-19	Albury	11.2	22.5	10.6	43	24	17	47	32
18	2008-12-20	Albury	9.8	25.6	0.0	26	17	6	45	26

Figure 1: THE DATASET

Methodology (1/2)

- Dropped columns with excessive missing values:

    - Evaporation, Sunshine, Cloud9am, Cloud3pm

- Dropped Wind Direction variables
- Converted RainToday/RainTomorrow to binary (0/1)
- Removed rows with missing values

City

Cairns
Darwin
CoffsHarbour
GoldCoast
Williamtown
Wollongong
Sydney
Townsville
NorahHead
NorfolkIsland

0 2 4 6

Average Rainfall (mm)

Methodology (2/2)

- Selected four variables to analyze climatic variation:
  - Rainfall $\rightarrow$ Precipitation patterns
  - Temp3pm $\rightarrow$ Daytime temperature
  - Humidity3pm $\rightarrow$ Moisture in the air
  - Pressure9am $\rightarrow$ Atmospheric pressure patterns

Location	Avg Rainfall	Avg Temp (3pm)	Avg Humidity (3pm)	Avg Pressure (9am)
Cairns	5.7	27.9	61.7	1014.2
CoffsHarbour	5.0	22.3	62.3	1018.3
Darwin	5.1	31.1	51.7	1011.9
GoldCoast	3.6	23.7	62.8	1018.0
NorahHead	3.4	20.8	67.5	1018.3
NorfolkIsland	3.1	20.4	67.8	1017.7
Sydney	3.5	21.8	54.3	1018.3
Townsville	3.4	27.8	57.3	1015.2
Williamtown	3.6	22.7	53.2	1018.4
Wollongong	3.5	19.9	65.1	1018.1

Results (1/2)

- **Temperature Patterns**:
  - Cities like Darwin and Alice Springs have the highest and most stable afternoon temperatures.
  - Cities like Hobart and Sydney show greater variation and cooler median temperatures.

- **Climate Zones**:
  - Tropical and desert regions = stable, high temperatures.
  - Temperate/coastal cities = cooler, more variable temperatures.

Results (2/2)

- **Boxplot Insights**: Darwin: Hot, stable temperatures. Hobart, Melbourne, Sydney: Cooler, variable. Perth, Brisbane: Outliers indicate extremes.
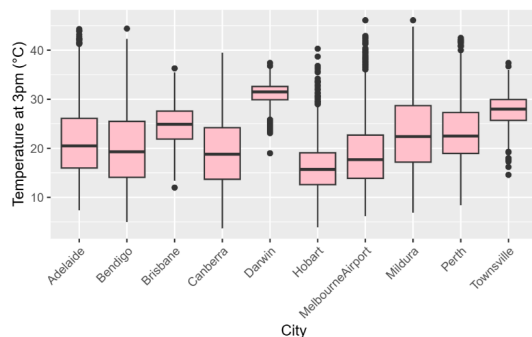
Conclusion & Recommendations

The climate of Australian cities varies significantly by location - Northern and inland areas: warmer and more stable in temperature - Southern and coastal cities: cooler, more variable weather.

- **For Planners**
- **For Tourists**

- **For Research**:
    - Incorporate Time Dimension
    - Visualize More Variables
    - Explore Extreme Events
    - Forecast rain tomorrow

Thank You