

Temperature Report

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1.0 Abstract

In this experiment, it was observed that there are a number of similarities between temperature trends in Chinese Cities and Australian States. One major similarity is that yearly temperature changes are often reflected across the entire data set, and a consistent trend is usually followed. However, there is one major difference between the two data sets. The biggest difference between them is that while Chinese cities have more consistent temperatures if they are warmer on average, and have less consistent temperatures if they are colder on average Australian state data reflects the opposite. The states which have a higher average temperature have significant temperature variance, however the states which are colder have very consistent annual temperatures. Without analysing more global data, it is impossible to draw generalised conclusions on the meaning of this data. However, it can be concluded that Chinese and Australian temperatures follow similar trends but they differ in temperature consistency.

2.0 Introduction

The purpose of this report is to analyse temperature patterns between Australian states and Chinese provinces using a series of graphs generated using data from an excel spreadsheet, which is itself generated using a python program. The programs used for the development of this data and the report will be contained in the same directory as this file. The operation, purpose and usage of each program is discussed in 1.1 , and the structure of the database used for the programs is discussed in 1.2.

2.1 File Descriptions

1. db_create.py - Creates a database file called 'data.db' and populates it with the data contained in GlobalLandTemperaturesByMajorCity.xlsx, GlobalLandTemperaturesByState.xlsx and GlobalLandTemperaturesByCountry.xlsx if they are contained within the 'xl' folder.
2. sql_temp.py - Creates a new table containing Southern Hemisphere major cities, and prints the lowest highest and mean recorded temperature for Queensland
3. excel_temp.py - Selects the average yearly temperature for each chinese city, inserts the data into a new excel spreadsheet titled 'World Temperature.xlsx' and creates a graph in the spreadsheet for the data. This data is analysed in section 2.1.
4. numpy_temp.py - Selects the average yearly temperature for each Australian state, as well as the national average and generates a graph to visualise the data using Python's Matplotlib library. The program then inserts the data into a new page on the excel spreadsheet created by excel_temp.py. This data is analysed in section 2.2.

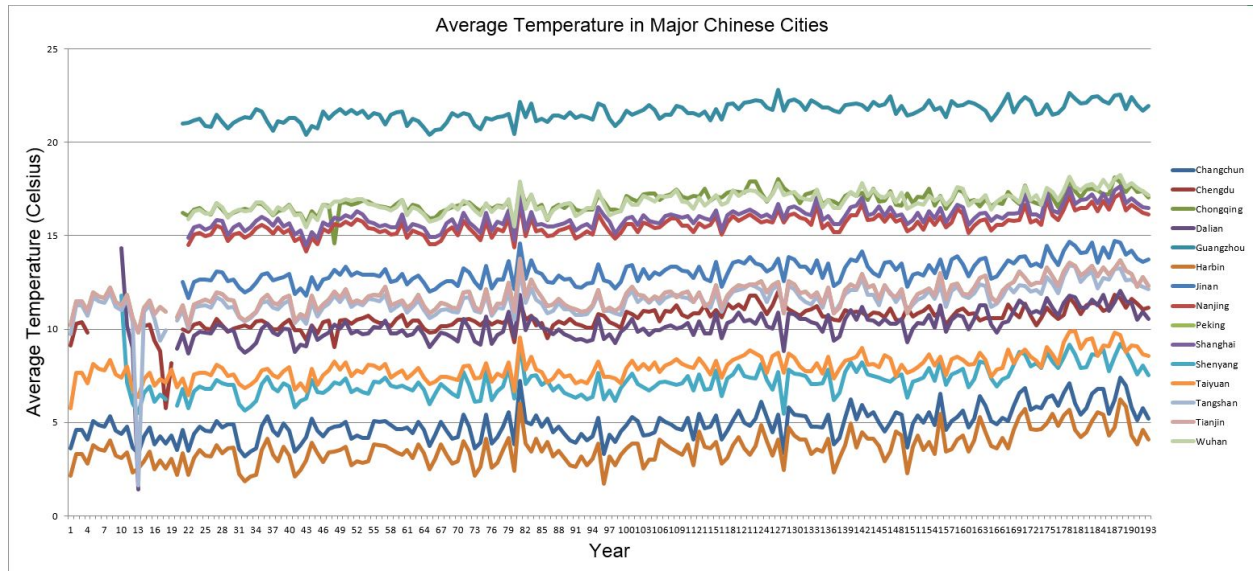
2.2 Database Structure

See below for a UML diagram demonstrating the structure of each table.



3.0 Results & Discussion

3.1 Chinese City Temperature Data

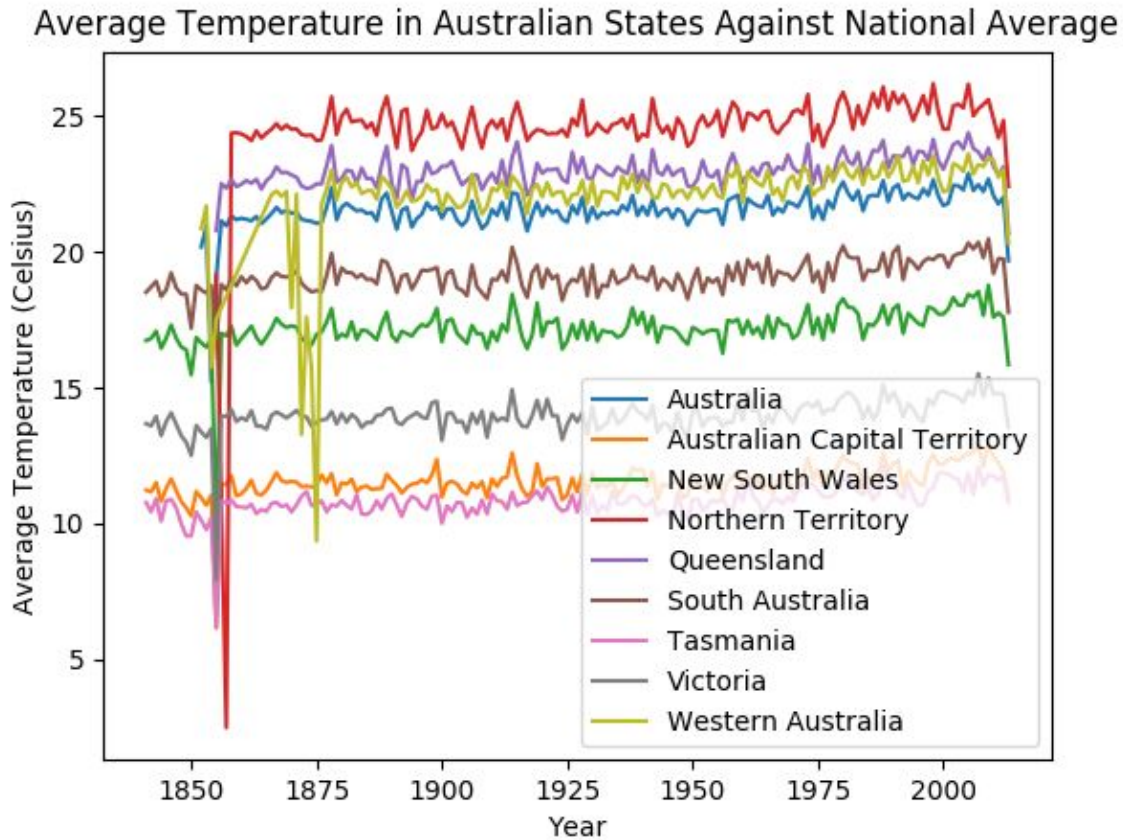


3.1.1 Discussion

A programming error in the graph shows the year axis to display the row index in the spreadsheet rather than the labelled year. This should be taken into consideration when analysing the graph. In addition to this, several rows with no recorded temperature data have been omitted from the graph, and show up as blank in the table.

The results of the Chinese city temperature data shows that cities which have a historically high temperature such as Guangzhou, Wuhan and Chongqing often have consistent temperatures with low variance. However, cities such as Xian, Changchun and Shenyang which have historically lower than average temperatures often have temperatures which vary with great intensity. In addition to this, although intensity may vary greatly between cities there is an observable trend in the rising and falling of temperatures being largely consistent between states. This is especially visible in the two coldest states, Changchun and Harbin which follow an extremely uniform temperature pattern.

3.2 Australian State and National Temperature Data



3.2.1 Discussion

Recorded anomaly values for Northern Territory, Western Australia, New South Wales and Tasmania between 1850 and 1900 are considered erroneous and should not be taken into consideration when analysing this graph.

The above graph demonstrates that the consistent hottest state in Australia is the Northern Territory, which is the state which is closest to the equator geographically and the coldest state in Australia is Tasmania, which is the furthest state from the equator. Compared to the recorded national average, only Western Australia, Queensland and the Northern Territory are consistently warmer and all other states are consistently colder. Queensland and Western Australia are the states which have temperature values which are closest to the national average, and typically only vary from it by at most three degrees. It is observable from the data that all of the states follow a loose temperature trend - while their temperatures are different, they all increase and decrease by year in a very similar pattern. It is observed that unlike the Chinese temperature data, cities with a higher average temperature have much less consistent average temperatures than states with a lower average temperature, which have low temperature variation.