Exploring Weather Trends

Surabaya

Bandung

Jakarta

Analyzing local weather trends of 3 Indonesia cities along with global weather trends

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Extracting Data

year	avg_temp_bandung	avg_temp_world
1825	24.64	8.39
1839	23.93	7.63
1840	23.86	7.8
1841	23.39	7.69
1850	24.15	7.9
1851	24.33	8.18
1852	24.21	8.1
1853	24.13	8.04
1854	24.28	8.21
1855	24.36	8.11

Extracted Data form example which is extracted with SQL query (the query listed in the SQLtext notes)

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Null Value

year	avg_temp_bandung	avg_temp_world
1825	24.64	8.39
1839	23.93	7.63
1840	23.86	7.8
1841	23.39	7.69
1850	24.15	7.9
1851	24.33	8.18
1852	24.21	8.1
1853	24.13	8.04
1854	24.28	8.21
1855	24.36	8.11

As noticed in example, some of the year are missing due to Null value. In order to be able to give an accurate observation, all of the years with Null value are omitted.

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Moving Average Application

year	avg_temp_bandung	avg_temp_world	mov_temp_bandung	mov_temp_world
1825	24.64	8.39		
1839	23.93	7.63		
1840	23.86	7.8		
1841	23.39	7.69		
1850	24.15	7.9		
1851	24.33	8.18		
1852	24.21	8.1		
1853	24.13	8.04		
1854	24.28	8.21		
1855	24.36	8.11	=AVERAGE(H2:H11)	=AVERAGE($K2:$K11)

In order to make it easier to observe, the moving average is used to both the average temperature of the cities and world by averaging 10 data entries

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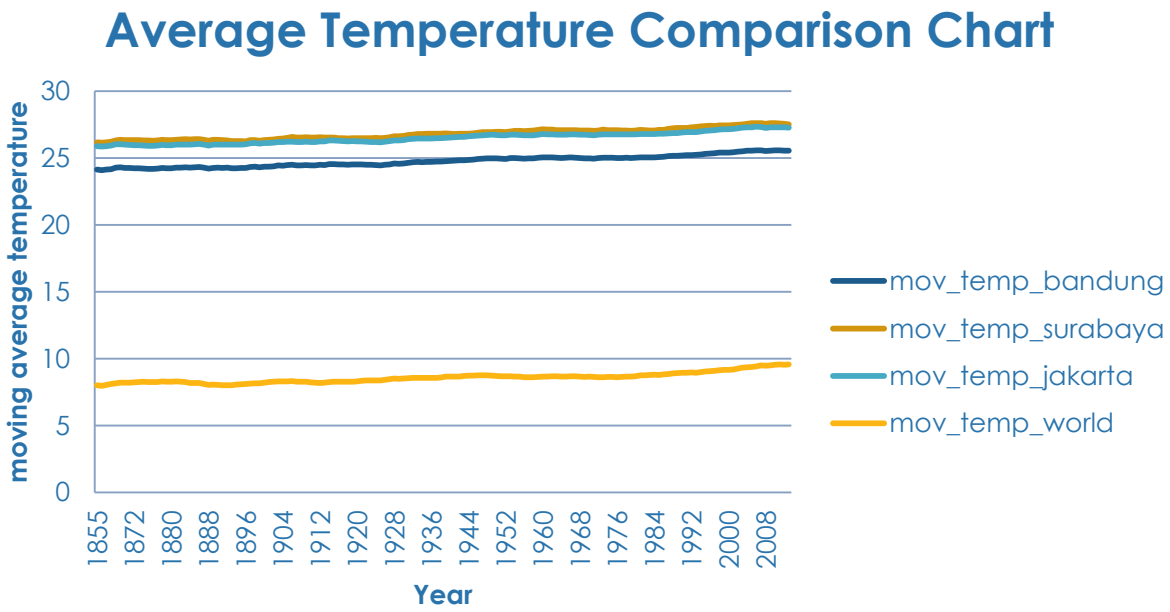
Line Chart



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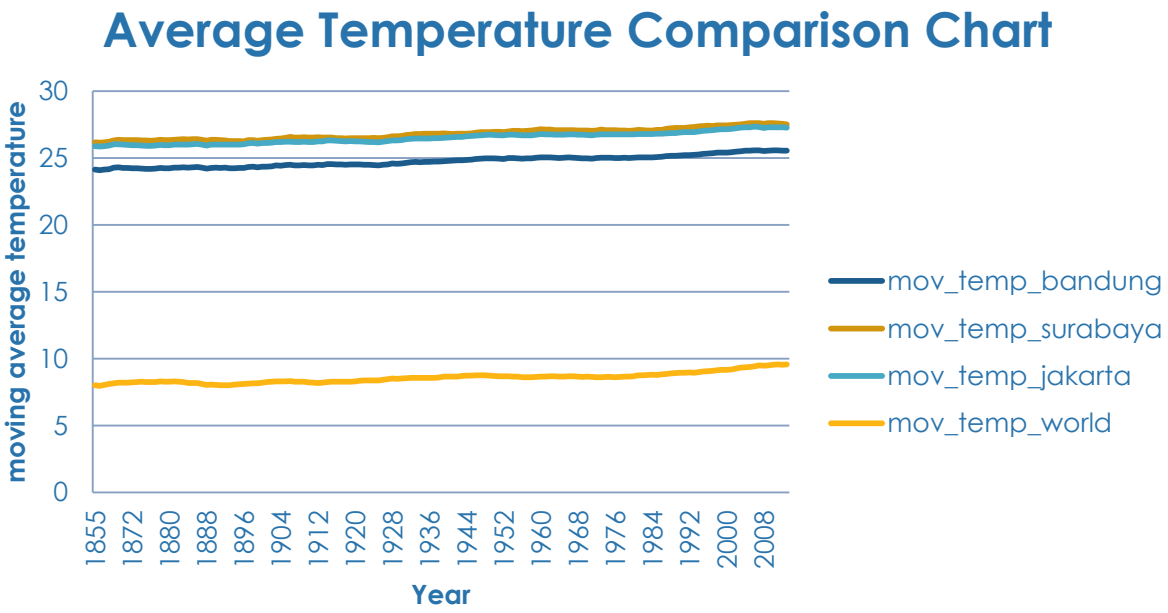
Observation 1



All of the cities are hotter (especially Surabaya)than world average temperature

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Observation 1

Year	Bandung differences	Surabaya differences	Jakarta differences
1855	16.123	18.169	17.877
1856	16.127	18.166	17.884
1866	16.091	18.135	17.853
1867	16.059	18.11	17.816
1868	16.112	18.165	17.859
1869	16.081	18.147	17.82
1870	16.051	18.127	17.786
1871	16.031	18.113	17.762
1872	16.012	18.109	17.723
1873	15.988	18.089	17.708

It can be inferred that the changes has been consistent as shown in the example of the table of cities temperature differences with global temperature

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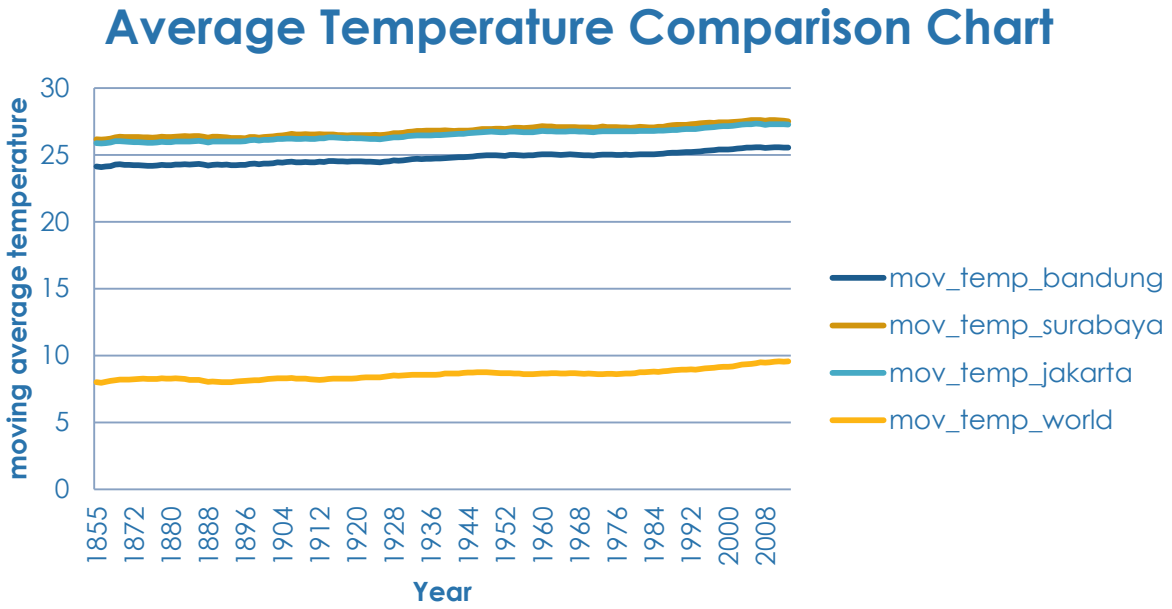
Observation 2

Correlation coefficient

$R_{bdg} = 0.959$

$R_{sby} = 0.955$

$R_{jkt} = 0.957$



The correlation indicating that there is a strong positive relationship between each cities average temperature with world average temperature

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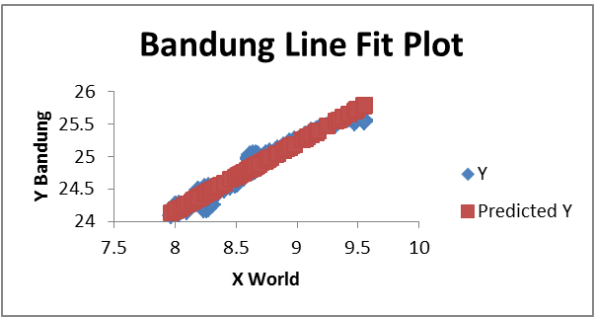
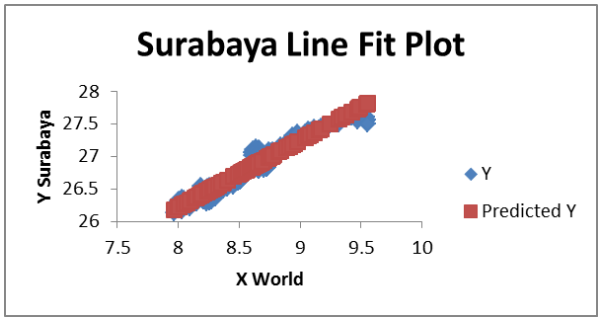
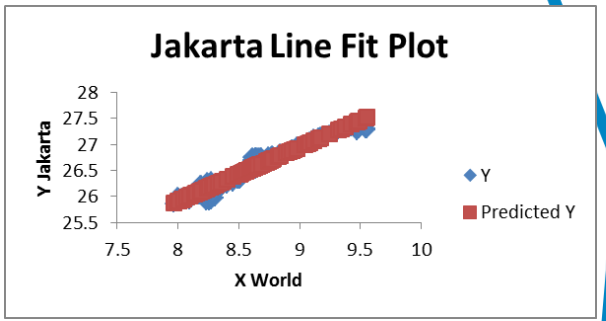
Observation 3

Regression Model







$Y_{bdg} = 15.82 + 1.04\ X_{world}$

$Y_{sby} = 18.002 + 1.03\ X_{world}$

$Y_{jkt} = 18.002 + 1.03\ X_{world}$

With the help of regression, we can also estimate the average temperature of each cities by knowing the world average temperature by fitting it in the model

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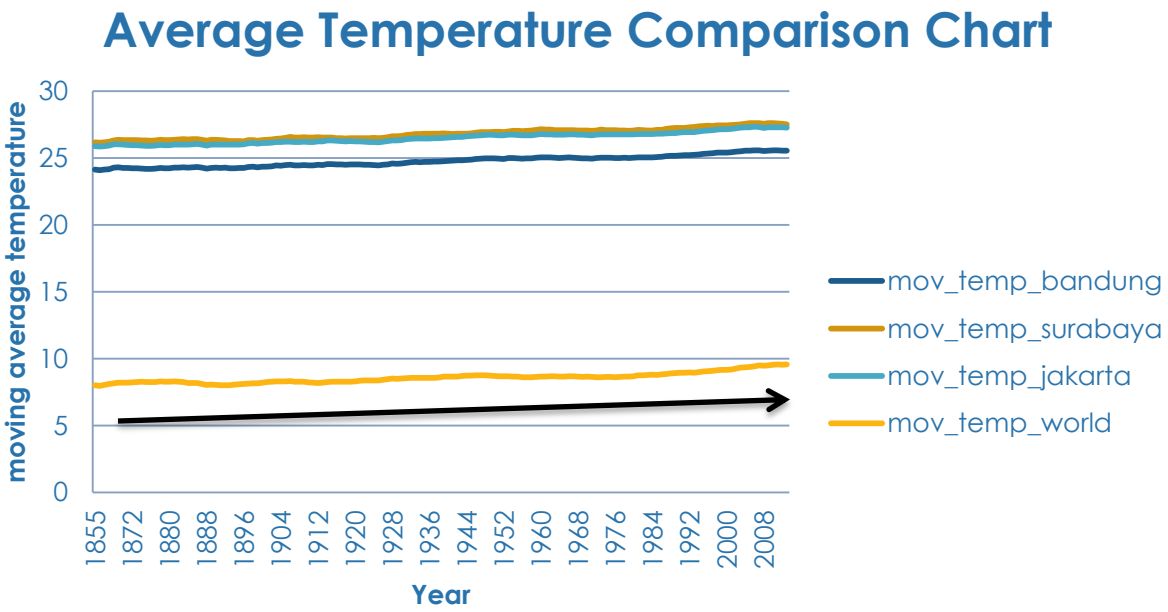
Observation 4



There is a strong trend in the long-run that the average temperature getting hotter each year with slight variation.

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Conclusion

All of the cities are hotter (especially Surabaya) than world average temperature and their changes has been consistent

Strong and positive correlation coefficient between each cities and world average temperature indicates that strong ties

Each cities have their own models which can indicate each of their average temperature by knowing the world average temperature

Strong trends that each year all of the cities and world average temperature getting hotter in the long run