What tools did you use for each step?

Firstly: I have used SQL for extracting my data from the database:

For city level data:

```
1    SELECT * FROM city_data WHERE country LIKE 'Uz%'
```

For global data:

```
1    SELECT * FROM global_data
```

And then I have used "Download CSV" button in order to expert data to my computer.
After that, I have used Google Sheets in order to measure moving average and to draw charts.

How did you calculate the moving average?

I have selected 7, 14, 21 moving averages. In order to calculate the moving averages, I have used AVERAGE() function in Google sheets and here are they:

	A	B	C	D	E
	year	city	country	avg_temp	7_moving_avg
	1832	Tashkent	Uzbekistan	9.48	
	1833	Tashkent	Uzbekistan	9.93	
	1834	Tashkent	Uzbekistan	9.95	
	1835	Tashkent	Uzbekistan	9.15	
	1836	Tashkent	Uzbekistan	9.65	
	1837	Tashkent	Uzbekistan	9.32	9.5 ×
	1838	Tashkent	Uzbekistan	9.02	=AVERAGE(D2:D8

year	city	country	avg_temp	7_moving_avg	14_moving_avg	21_
1832	Tashkent	Uzbekistan	9.48			
1833	Tashkent	Uzbekistan	9.93			
1834	Tashkent	Uzbekistan	9.95			
1835	Tashkent	Uzbekistan	9.15			
1836	Tashkent	Uzbekistan	9.65			
1837	Tashkent	Uzbekistan	9.32			
1838	Tashkent	Uzbekistan	9.02	9.5		
1839	Tashkent	Uzbekistan	9.05	9.438571429		
1840	Tashkent	Uzbekistan	9.63	9.395714286		
1841	Tashkent	Uzbekistan	9.13	9.278571429		
1842	Tashkent	Uzbekistan	10.1	9.414285714		
1843	Tashkent	Uzbekistan	10.51	9.537142857		
1844	Tashkent	Uzbekistan	9.38	9.545714286		
1845	Tashkent	Uzbekistan	9.66	9.637142857	=AVERAGEA(D2:D15	9.568571429 ×

year	city	country	avg_temp	7_moving_avg	14_moving_avg	21_moving_avg
1832	Tashkent	Uzbekistan	9.48			
1833	Tashkent	Uzbekistan	9.93			
1834	Tashkent	Uzbekistan	9.95			
1835	Tashkent	Uzbekistan	9.15			
1836	Tashkent	Uzbekistan	9.65			
1837	Tashkent	Uzbekistan	9.32			
1838	Tashkent	Uzbekistan	9.02	9.5		
1839	Tashkent	Uzbekistan	9.05	9.438571429		
1840	Tashkent	Uzbekistan	9.63	9.395714286		
1841	Tashkent	Uzbekistan	9.13	9.278571429		
1842	Tashkent	Uzbekistan	10.1	9.414285714		
1843	Tashkent	Uzbekistan	10.51	9.537142857		
1844	Tashkent	Uzbekistan	9.38	9.545714286		
1845	Tashkent	Uzbekistan	9.66	9.637142857	9.568571429	
1846	Tashkent	Uzbekistan	10.33	9.82	9.629285714	
1847	Tashkent	Uzbekistan	9.79	9.842857143	9.619285714	
1848	Tashkent	Uzbekistan	9.25	9.86	9.569285714	
1849	Tashkent	Uzbekistan	9.84	9.822857143	9.618571429	
1850	Tashkent	Uzbekistan	9.59	9.691428571	9.614285714	
1851	Tashkent	Uzbekistan	9.84	9.757142857	9.651428571	9.64 ×
1852	Tashkent	Uzbekistan	9.84	9.782857143	9.71	=AVERAGE(D2:D22

What were your key considerations when deciding how to visualize the trends?

I have viewed the data of global and local average temperatures and realized that local year starts with 1832 and ends with 2013, whereas global starts with 1750 and ends with 2015. Thus, the key consideration was to take years which exist in both. Hence, I took years form 1832 till 2013. I have copied two columns of global data and pasted into local data. Afterwards I have deleted extra raws of global data. Here it is:

year	city	country	loc_avg_temp	7_moving_avg	14_moving_avg	21_moving_avg	year	glob_avg_temp	7_moving_avg	14_moving_avg	21_moving_avg
1832	Tashkent	Uzbekistan	9.48				1832	7.45			
1833	Tashkent	Uzbekistan	9.93				1833	8.01			
1834	Tashkent	Uzbekistan	9.95				1834	8.15			
1835	Tashkent	Uzbekistan	9.15				1835	7.39			
1836	Tashkent	Uzbekistan	9.65				1836	7.7			
1837	Tashkent	Uzbekistan	9.32				1837	7.38			
1838	Tashkent	Uzbekistan	9.02	9.5			1838	7.51	7.655714286		
1839	Tashkent	Uzbekistan	9.05	9.438571429			1839	7.63	7.681428571		
1840	Tashkent	Uzbekistan	9.63	9.395714286			1840	7.8	7.651428571		
1841	Tashkent	Uzbekistan	9.13	9.278571429			1841	7.69	7.585714286		
1842	Tashkent	Uzbekistan	10.1	9.414285714			1842	8.02	7.675714286		
1843	Tashkent	Uzbekistan	10.51	9.537142857			1843	8.17	7.742857143		
1844	Tashkent	Uzbekistan	9.38	9.545714286			1844	7.65	7.781428571		
1845	Tashkent	Uzbekistan	9.66	9.637142857	9.568571429		1845	7.85	7.83	7.742857143	
1846	Tashkent	Uzbekistan	10.33	9.82	9.629285714		1846	8.55	7.961428571	7.821428571	
1847	Tashkent	Uzbekistan	9.79	9.842857143	9.619285714		1847	8.09	8.002857143	7.827142857	
1848	Tashkent	Uzbekistan	9.25	9.86	9.569285714		1848	7.98	8.044285714	7.815	
1849	Tashkent	Uzbekistan	9.84	9.822857143	9.618571429		1849	7.98	8.038571429	7.857142857	
1850	Tashkent	Uzbekistan	9.59	9.691428571	9.614285714		1850	7.9	8	7.871428571	
1851	Tashkent	Uzbekistan	9.84	9.757142857	9.651428571		1851	8.18	8.075714286	7.928571429	
1852	Tashkent	Uzbekistan	9.84	9.782857143	9.71	9.64	1852	8.1	8.111428571	7.970714286	7.865714286
1853	Tashkent	Uzbekistan	9.53	9.668571429	9.744285714	9.642380952	1853	8.04	8.038571429	8	7.893809524
1854	Tashkent	Uzbekistan	10.16	9.721428571	9.782142857	9.653333333	1854	8.21	8.055714286	8.029285714	7.903333333
1855	Tashkent	Uzbekistan	10.51	9.901428571	9.880714286	9.68	1855	8.11	8.074285714	8.059285714	7.901428571
1856	Tashkent	Uzbekistan	10.05	9.931428571	9.877142857	9.722857143	1856	8	8.077142857	8.057857143	7.93047619
1857	Tashkent	Uzbekistan	9.33	9.894285714	9.792857143	9.707619048	1857	7.76	8.057142857	8.028571429	7.933333333
1858	Tashkent	Uzbekistan	9.09	9.915714286	9.836428571	9.73952381	1858	8.1	8.045714286	8.060714286	7.967619048

Besides, I have calculated the annual difference percentage of local and global temperatures, temperature difference between global and local, standard deviation since I can understand the trends easily by doing so.

In order to calculate the annual difference in percentage, I have used this formula

=(D3−D2)/D2

	A	B	C	D	◀ ▶	I	◀	▶	M	N
	year	city	country	loc_avg_temp		glob_avg_temp			loc_anual_percei	glob_anual_percentage
	1832	Tashkent	Uzbekistan	9.48		7.45			0	0
	1833	Tashkent	Uzbekistan	9.93		8.01			4.75%	7.52%

In   order to calculate the temperature difference between global and local
       I used this expression:

`=D2-I2`

A	B	C	D	I	O
year	city	country	loc_avg_temp	glob_avg_temp	dif_loc_and_glob
1832	Tashkent	Uzbekistan	9.48	7.45	2.03
1833	Tashkent	Uzbekistan	9.93	8.01	1.92

ave_of_loc	ave_of_glob	min_of_loc	min_of_glob	max_of_loc	max_of_glob	standard_dev_lo	standard_dev_glob
10.31505495	8.486373626	8.41	7.38	13.66	9.73	0.8627271082	0.4963090654

So I have calculated the average of temperatures by AVERAGE() function,
MIN() function for minimum temperature, MAX() function for maximum
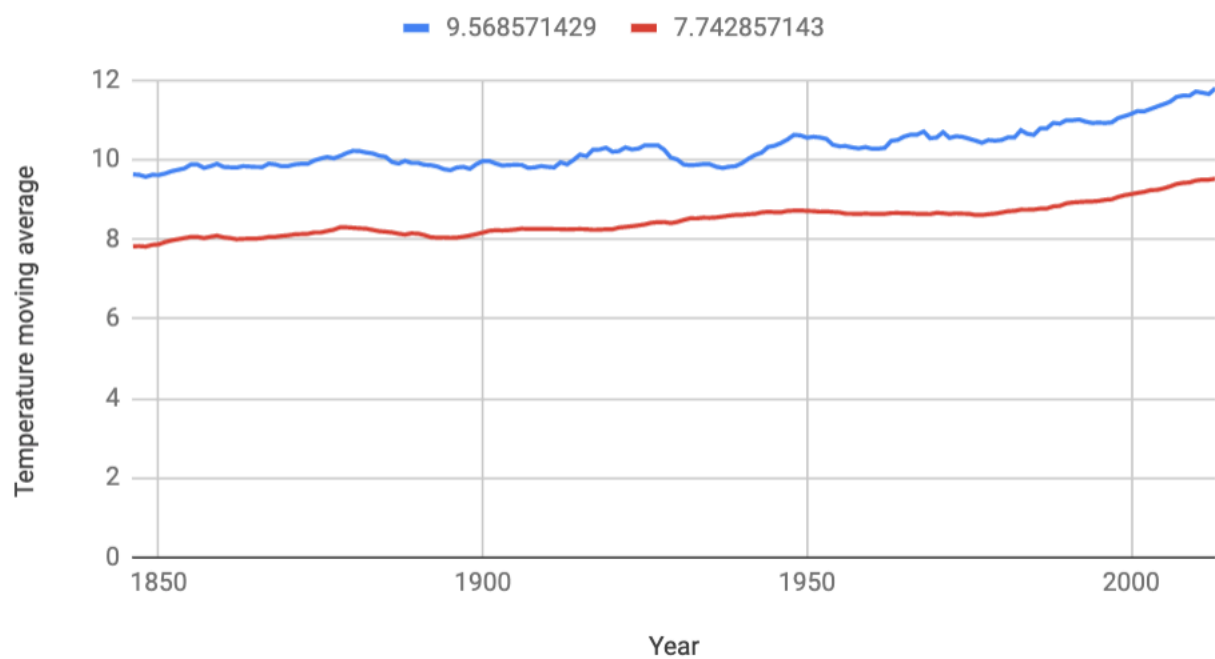temperature and STDEV() for standard deviation in Google Sheet.

Line charts:

Since I need to draw the chart, it starts with 1838 (1832+7), 1845
(1832+14) and 1852 (1832+21).

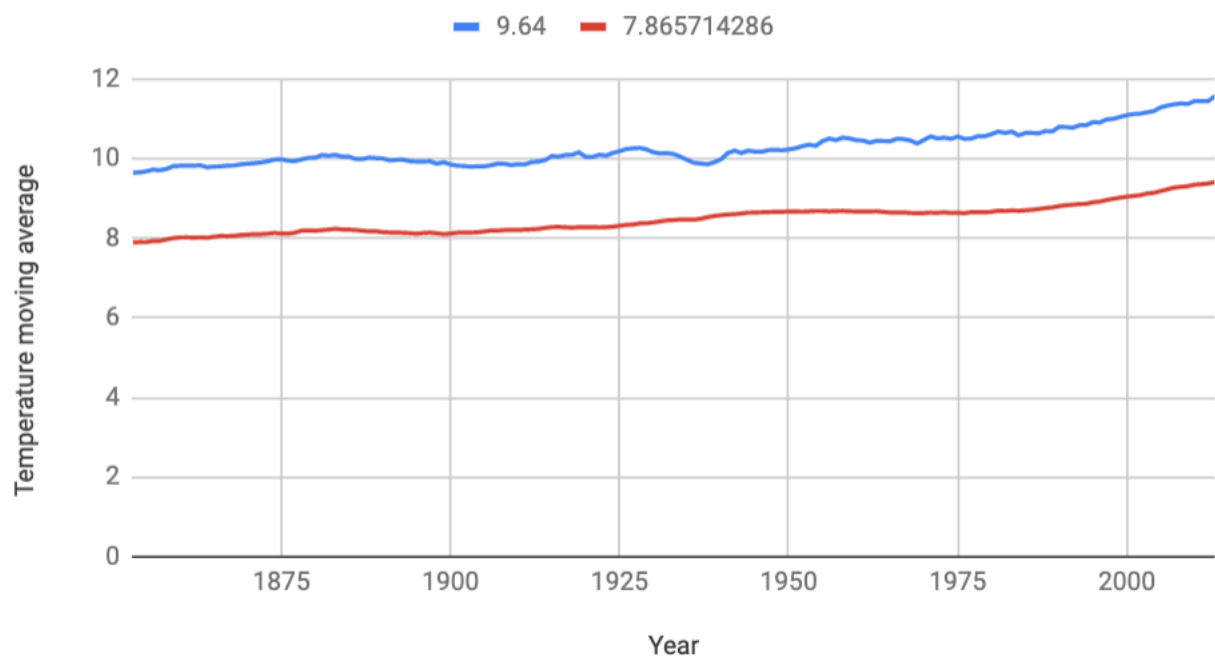Blue is local temperature and red is global temperature.
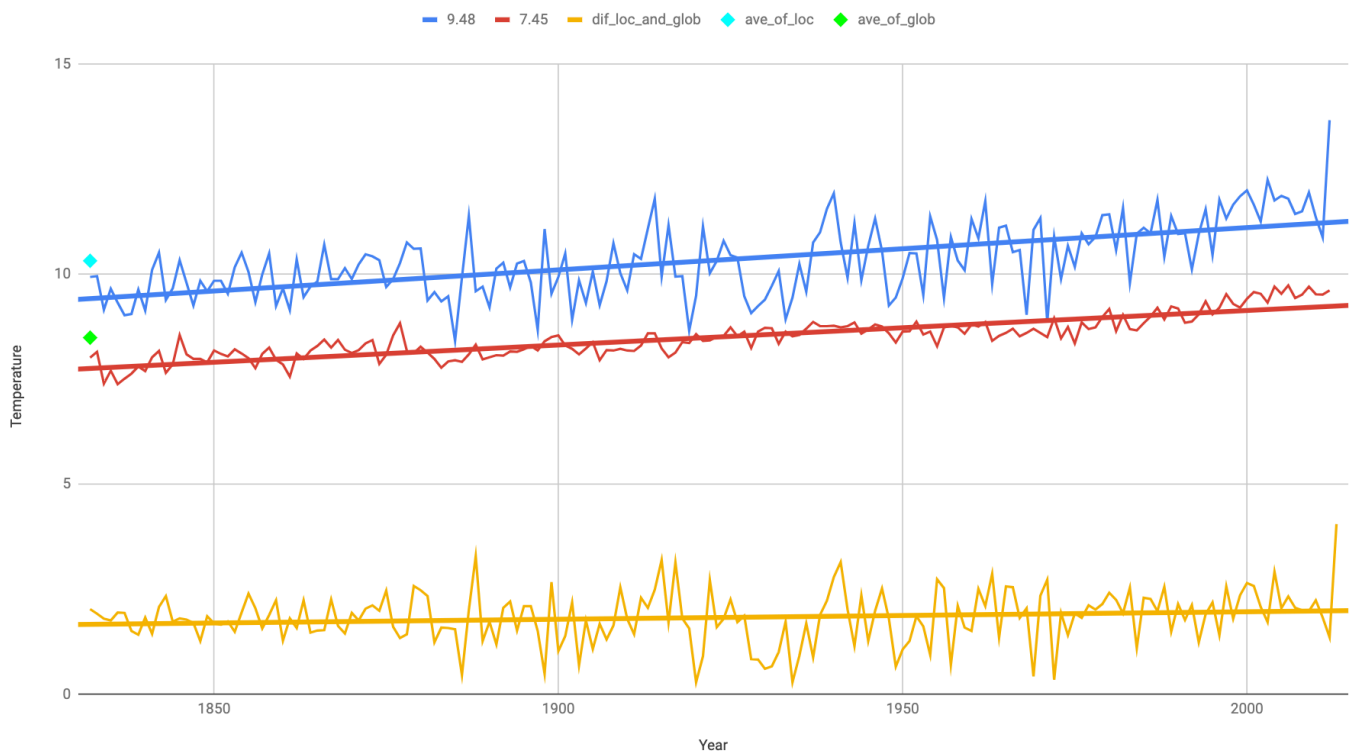
7 year moving average
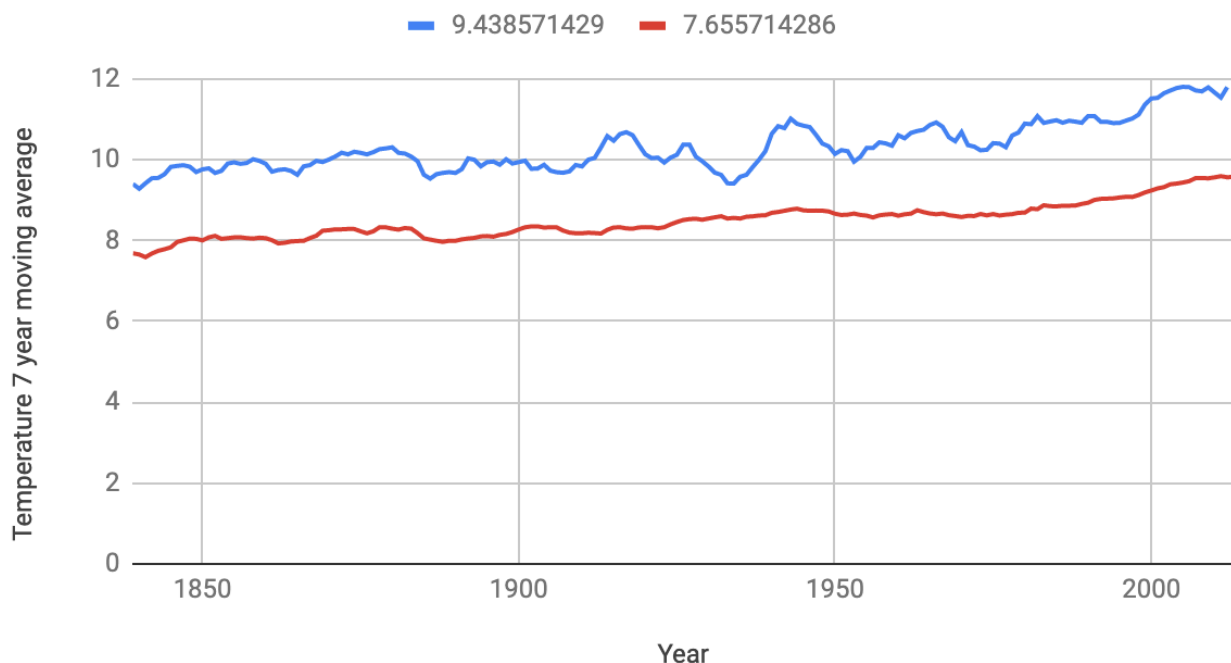
14 year moving average

21 year moving average

As you can see there are two diamonds which are sky blue and clear green. Sky blue represents average of local temperature and clear green represents average of global temperature. In addition, there are three linear lanes which represents the clear trends. Roughly speaking, blue and red linear lanes are increasing. However yellow linear lane is slowly but surely increasing also.

Observations:

1. Tashkent is hotter with 2-2.5 Celsius than global temperature. You can see it from average, min, max from the image.
2. Tashkent temperature and global temperature are both increasing.
3. Global temperature has smaller standard deviation than local temperature which means local temperature is increases faster than global temperature since standard deviation is square root of variance.
4. Differences between local and global temperatures were max 4.05 Celsius in 2013 whereas min 0.29 Celsius in 1920 and 1934.
5. You cannot estimate the average temperature in Tashkent by global temperature since average temperature of Tashkent is hotter than the global average temperature.
6. Average temperature of Tashkent fluctuates more rapidly than global average temperature does.

7. Correlation Coefficient of average local and global temperatures are 0.72.

`=CORREL(D2:D183,I2:I183)`

A	B			D			H	I			X	
year	city	◄	▶	loc_avg_temp	◄	▶		glob_avg_temp	◄	▶	Correlation Coefficient	
	1832	Tashkent			9.48				7.45		0.7215782086	
	1833	Tashkent			9.92				8.01			

My Google Sheet: https://docs.google.com/spreadsheets/d/1_Tns9f63OiusJEWVSj9D4Gsi2OP8Po5OSVspmDvaeGM/edit?usp=sharing