Metadata file for ABE 651 Assignment 9
Updated 4/22/20 by Danielle Wagner (wagne216)

Program name: program_09.py

Description:
Running programp_09.py will perform the following:

1. Import datafile 'DataQualityChecking.txt'
2. Performs a data quality check based on criteria related to ranges, missing values, and values relative to each other.
3. Writes filtered data to new file: 'DataQualityChecked.txt'
4. Outputs information about data that does not pass check

Data variables:

- Precipitation (mm), T_{max} (°C), T_{min} (°C), Wind Speed (m/s)

Data Quality Checks:
The results of the checks are summarized in Table 1. Data of missing values (n = 6) were filled in with NaN values (as np.nan). Each variable was processed as described below. Variables outside of the acceptable ranges were replaced with NaN's.

Table 1. Summary of results for the data quality check

	Precip	Max Temp	Min Temp	Wind Speed
1. No Data	2	2	2	0
2. Gross Error	15	14	2	2
3. Swapped	0	4	4	0
4. Range Fail	0	5	5	0

Precipitation
- Acceptable range: [0, 25] mm

Compared to the filtered data, there are 3 major unreasonable spikes (outside of the range by at least 50 mm) in the raw data as well 12 several others that were outside the range to a lesser extent.

Maximum and minimum air temperature
- Acceptable range: [-25, 35] °C

There are several major spikes in the raw data (at least 200 °C outside of the acceptable range), and the rest of the data is relatively close to the filtered data. An additional check switched the positions of (n=4) minimum and maximum temperatures when maximum was the lower of the 2 values. A final temperature check removed 5 values (for each) that were outside of the acceptable range for the day, when min and max differed by more than 25 °C.

Wind speed
- Acceptable range: [0, 10] m/s

Except for 2 major spikes (~= -1 and 40 m/s) that were eliminated, the filtered and raw data are the same.

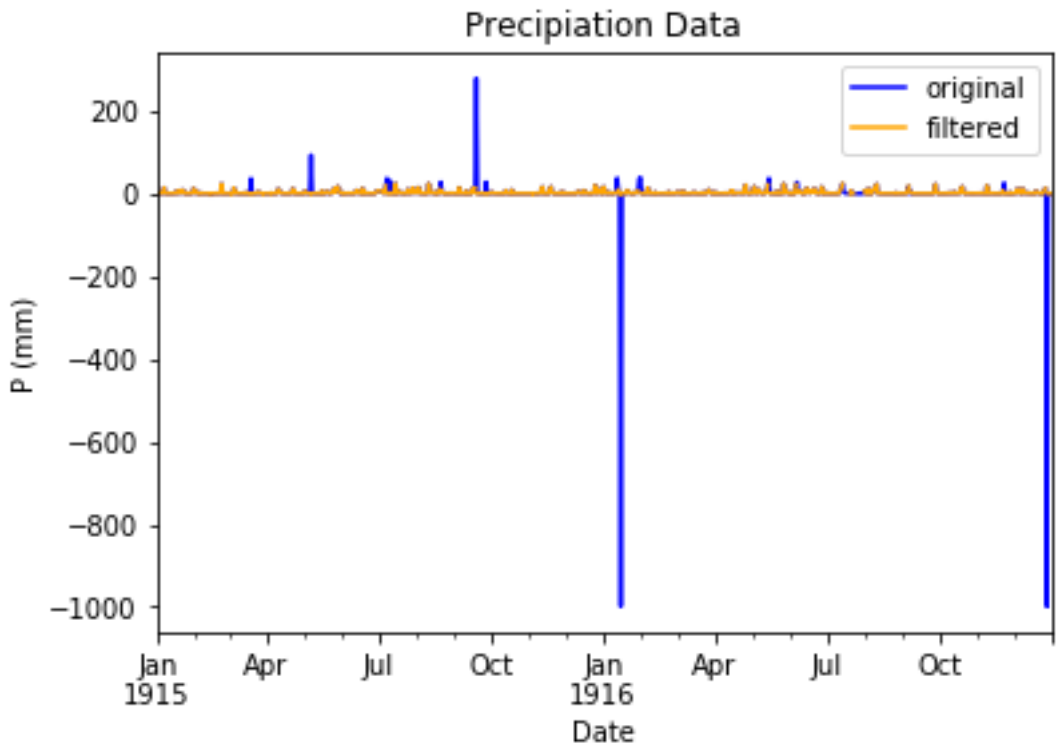

Figure 1. Precipitation data plotted before and after filtering the data.

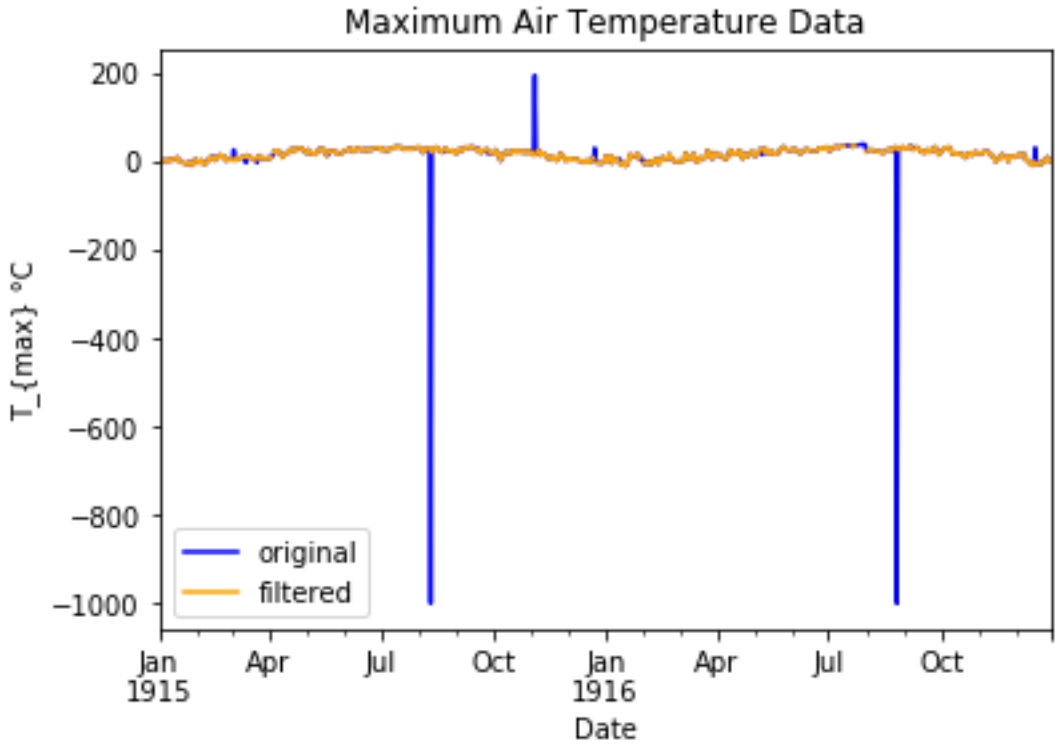

Figure 2. Maximum air temperature data plotted before and after filtering the data.

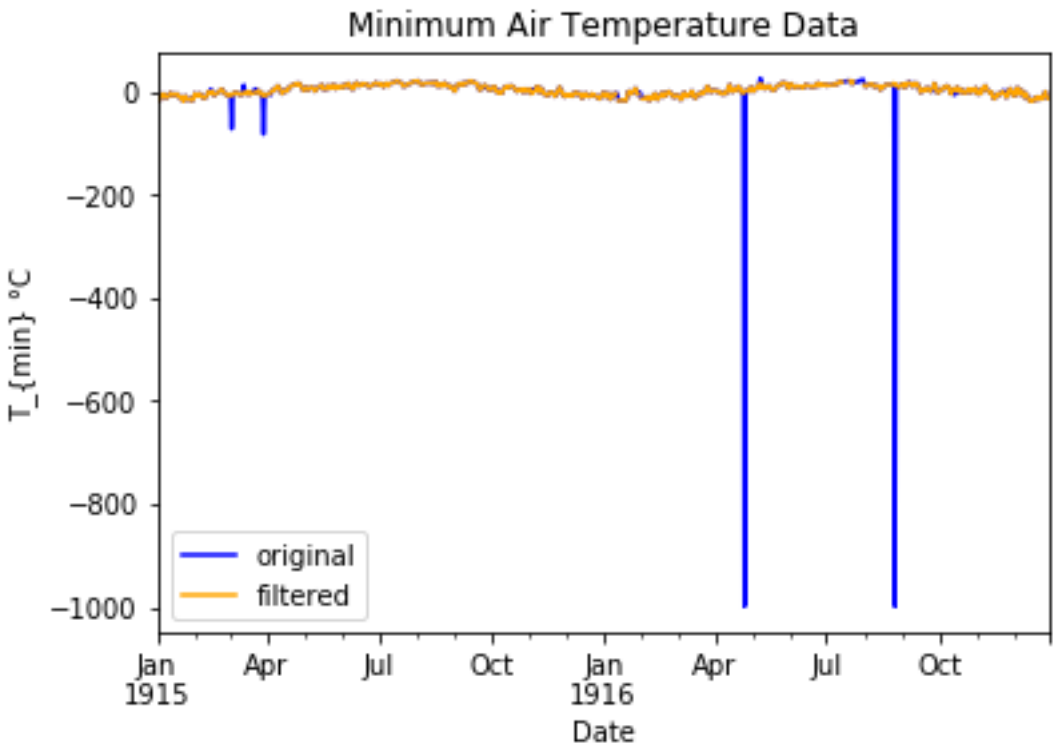

Figure 3. Minimum air temperature data plotted before and after filtering the data.

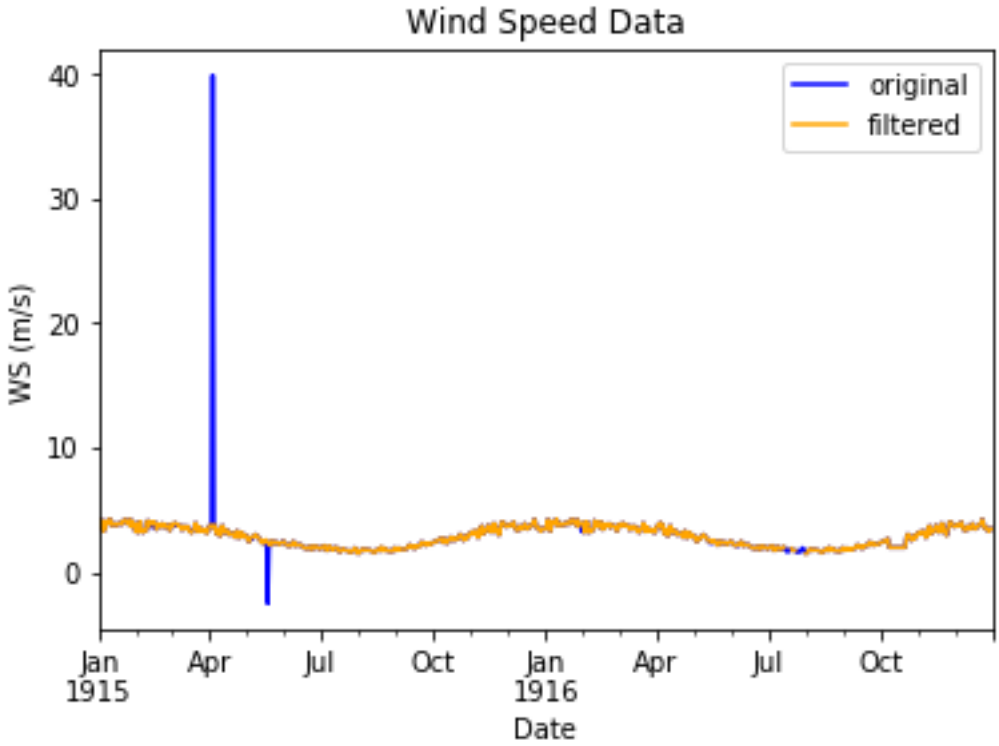

Figure 4. Wind speed data plotted before and after filtering the data.