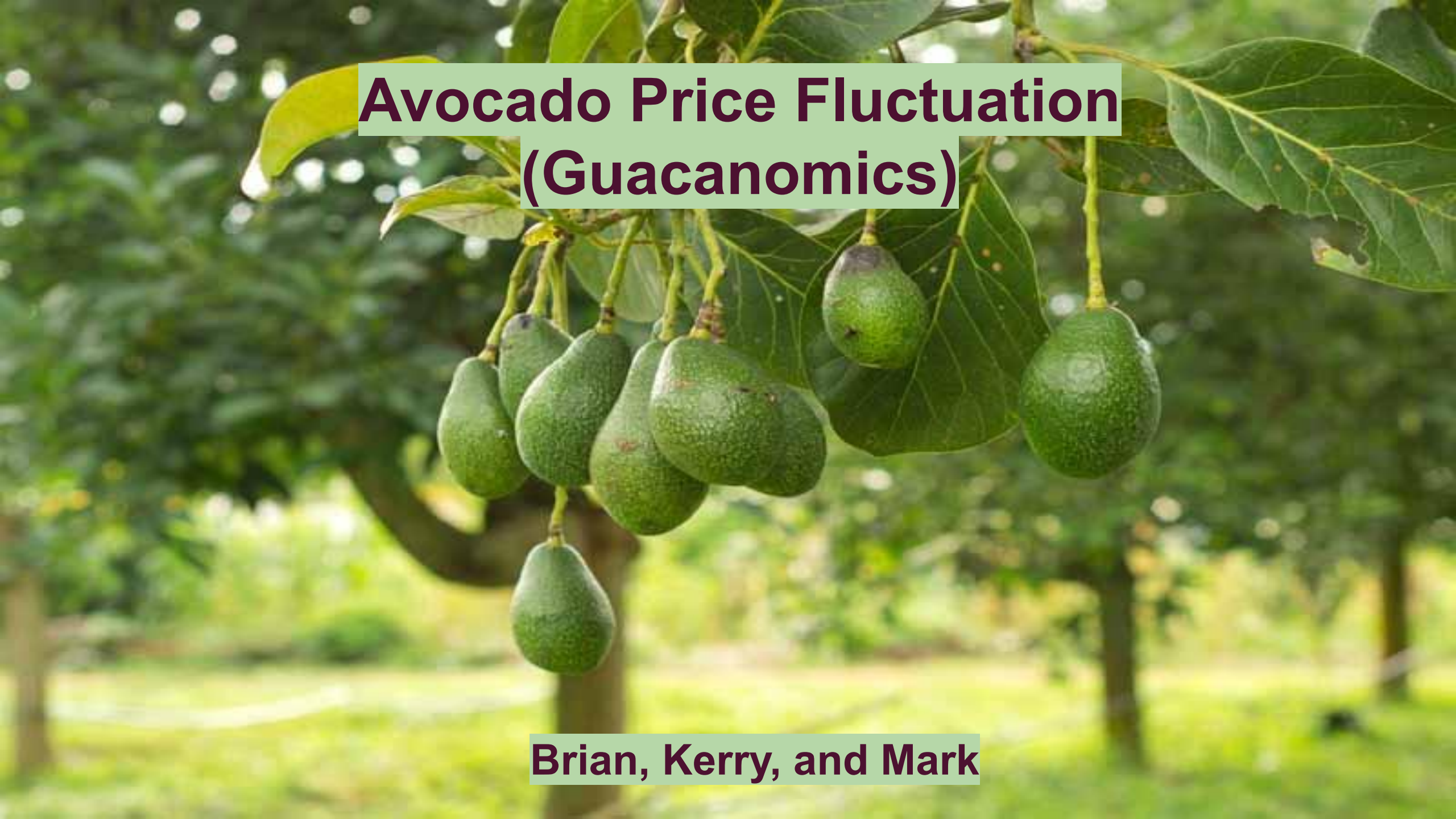


Avocado Price Fluctuation (Guacanomics)

Brian, Kerry, and Mark

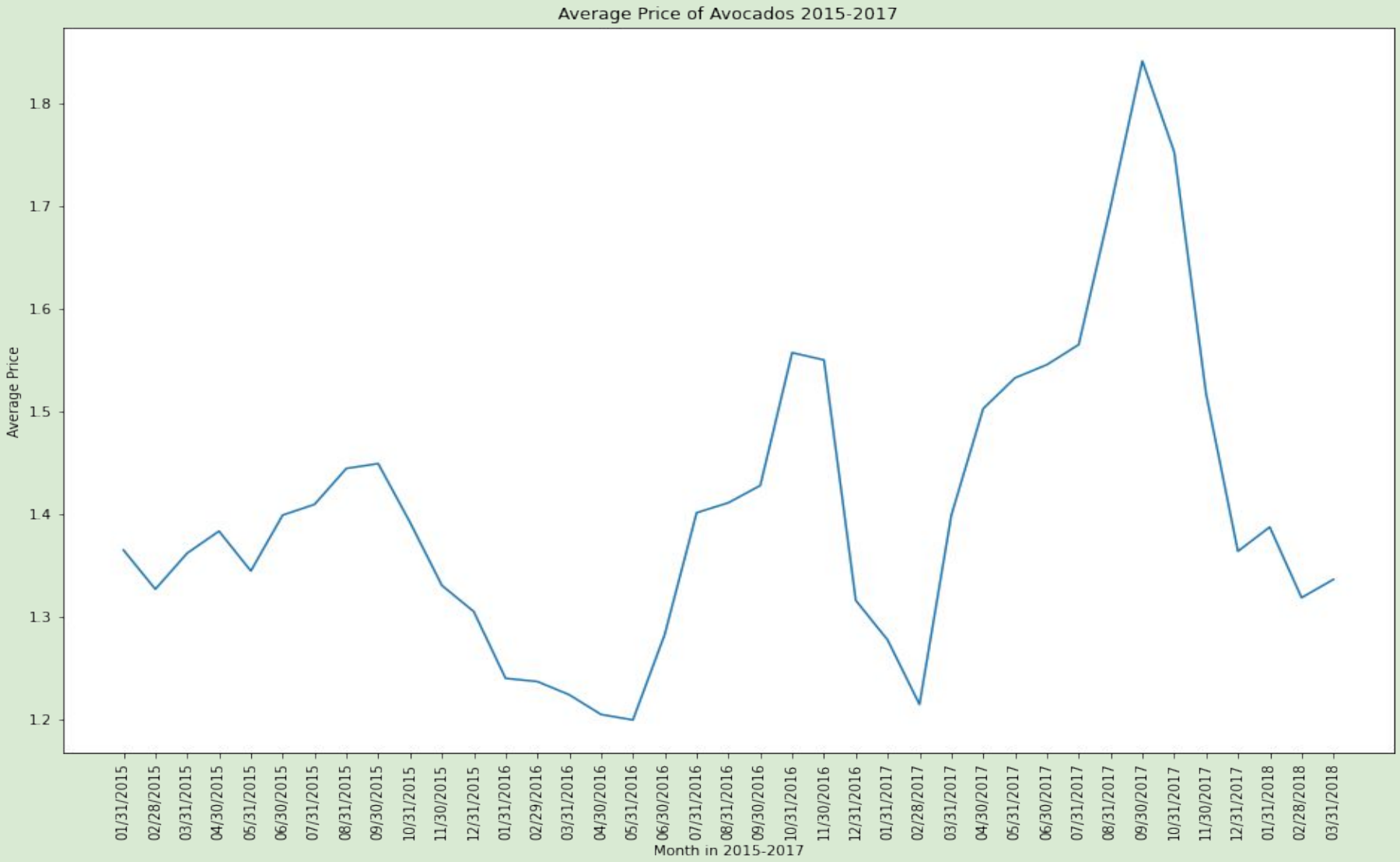
But why avocados?

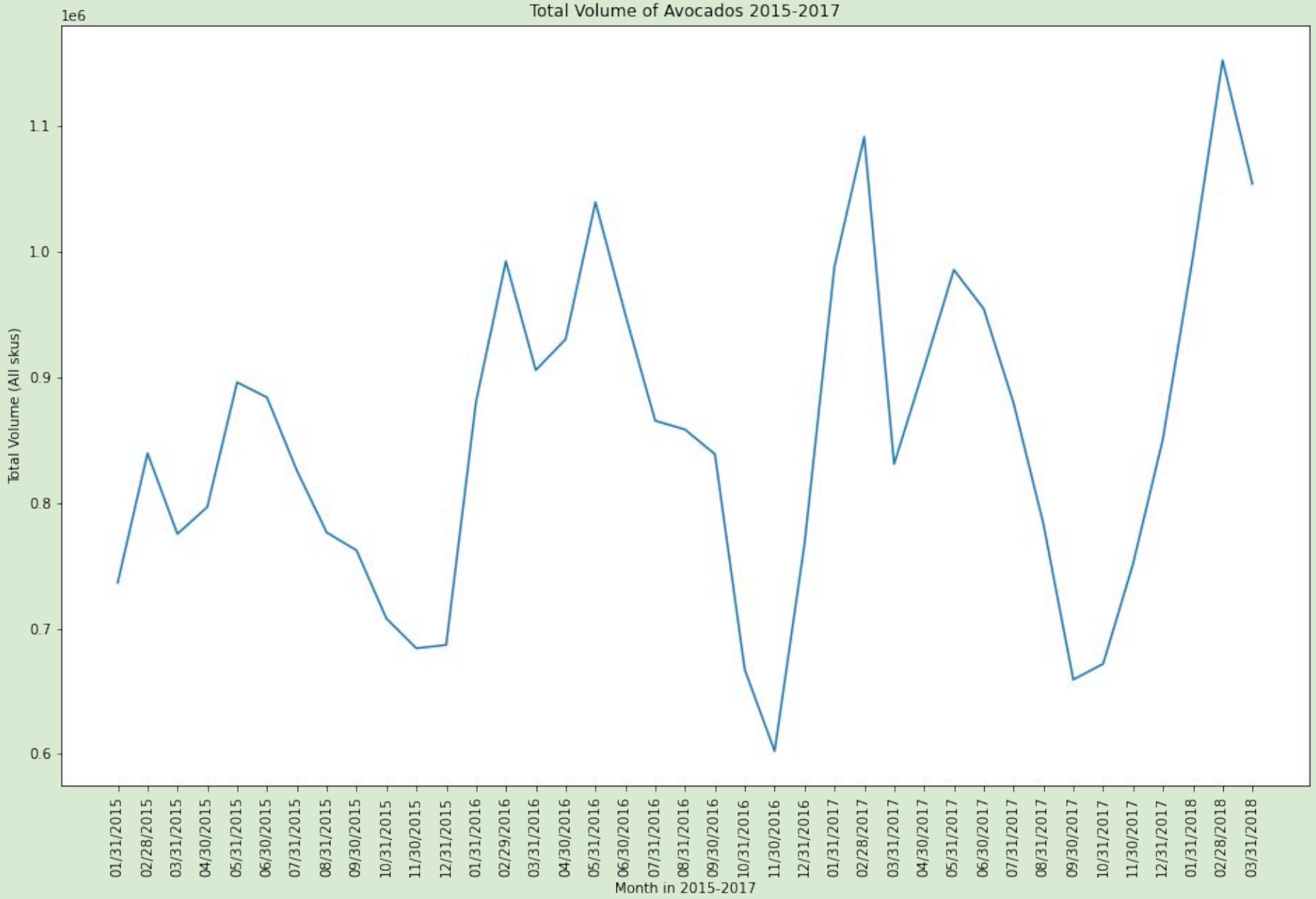
- Avocados are growing in popularity in the US, but the price fluctuates throughout the year.
- The US imports the vast majority of their avocados from Mexico due to its climate, and grows some in California.
- Could the price stabilize if supply is increased through additional growing regions within the US?
- What are some regions within the US that have similar weather patterns as California for part of the year?

In order to solve this problem...

- We found a dataset containing daily price of avocados from the years 2015-2017. Using this, we identified trends matching the supply of avocados throughout the years.
- We used a weather API to summarize average temperature and precipitation by month in order to compare existing growing regions with other regions in similar climate zones.
- Using this data, we identified 3 regions within the US which could potentially increase the supply of avocados, thereby reducing the price.

Data: Avocado Price Over Time




Total Volume of Avocados 2015-2017
1e6
1.1
1.0
0.9
0.8
0.7
0.6
Total Volume (All skus)
01/31/2015
02/28/2015
03/31/2015
04/30/2015
05/31/2015
06/30/2015
07/31/2015
08/31/2015
09/30/2015
10/31/2015
11/30/2015
12/31/2015
01/31/2016
02/29/2016
03/31/2016
04/30/2016
05/31/2016
06/30/2016
07/31/2016
08/31/2016
09/30/2016
10/31/2016
11/30/2016
12/31/2016
01/31/2017
02/28/2017
03/31/2017
04/30/2017
05/31/2017
06/30/2017
07/31/2017
08/31/2017
09/30/2017
10/31/2017
11/30/2017
12/31/2017
01/31/2018
02/28/2018
03/31/2018
Month in 2015-2017

Analysis

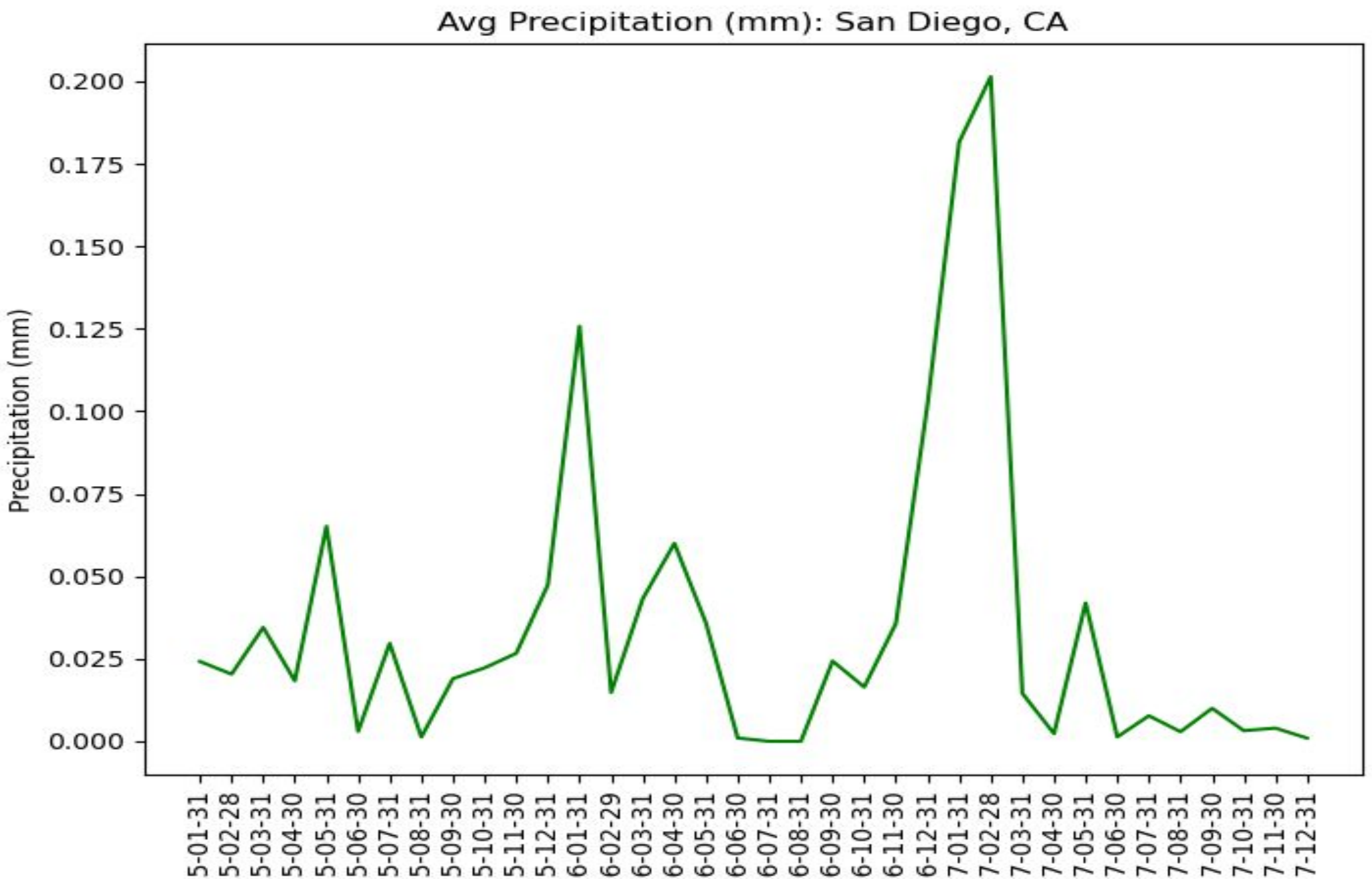
- In general, we see an inverse relationship between the total volume of avocados and the average price.

- We could hypothesize that stabilizing the volume of avocados on the market throughout the year could lower the average price of avocados during high-yield seasons.

Data: Current Growing Regions

- California Growing Region Centered Near San Diego
  - Rain Chart
  - Temperature Chart

- Mexican Growing Region Centered Around Michoacan
  - Rain Chart
  - Temperature Chart


Avg Precipitation (mm): San Diego, CA
Precipitation (mm)
0.200
0.175
0.150
0.125
0.100
0.075
0.050
0.025
0.000
5-01-31
5-02-28
5-03-31
5-04-30
5-05-31
5-06-30
5-07-31
5-08-31
5-09-30
5-10-31
5-11-30
5-12-31
6-01-31
6-02-29
6-03-31
6-04-30
6-05-31
6-06-30
6-07-31
6-08-31
6-09-30
6-10-31
6-11-30
6-12-31
7-01-31
7-02-28
7-03-31
7-04-30
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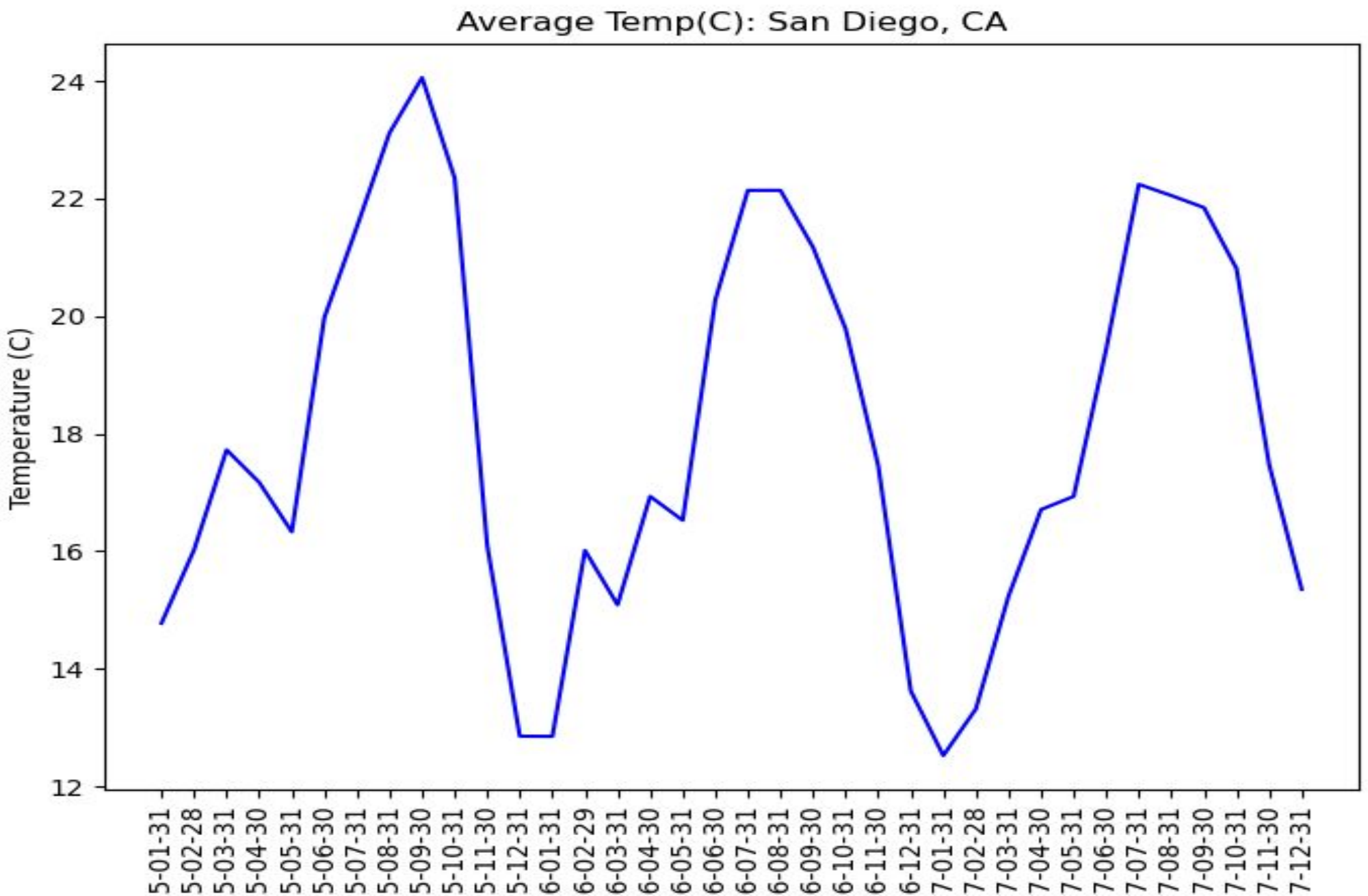
7-09-30
7-10-31
7-11-30
7-12-31


Average Temp(C): San Diego, CA
Temperature (C)
24
22
20
18
16
14
12
5-01-31
5-02-28
5-03-31
5-04-30
5-05-31
5-06-30
5-07-31
5-08-31
5-09-30
5-10-31
5-11-30
5-12-31
6-01-31
6-02-29
6-03-31
6-04-30
6-05-31
6-06-30
6-07-31
6-08-31
6-09-30
6-10-31
6-11-30
6-12-31
7-01-31
7-02-28
7-03-31
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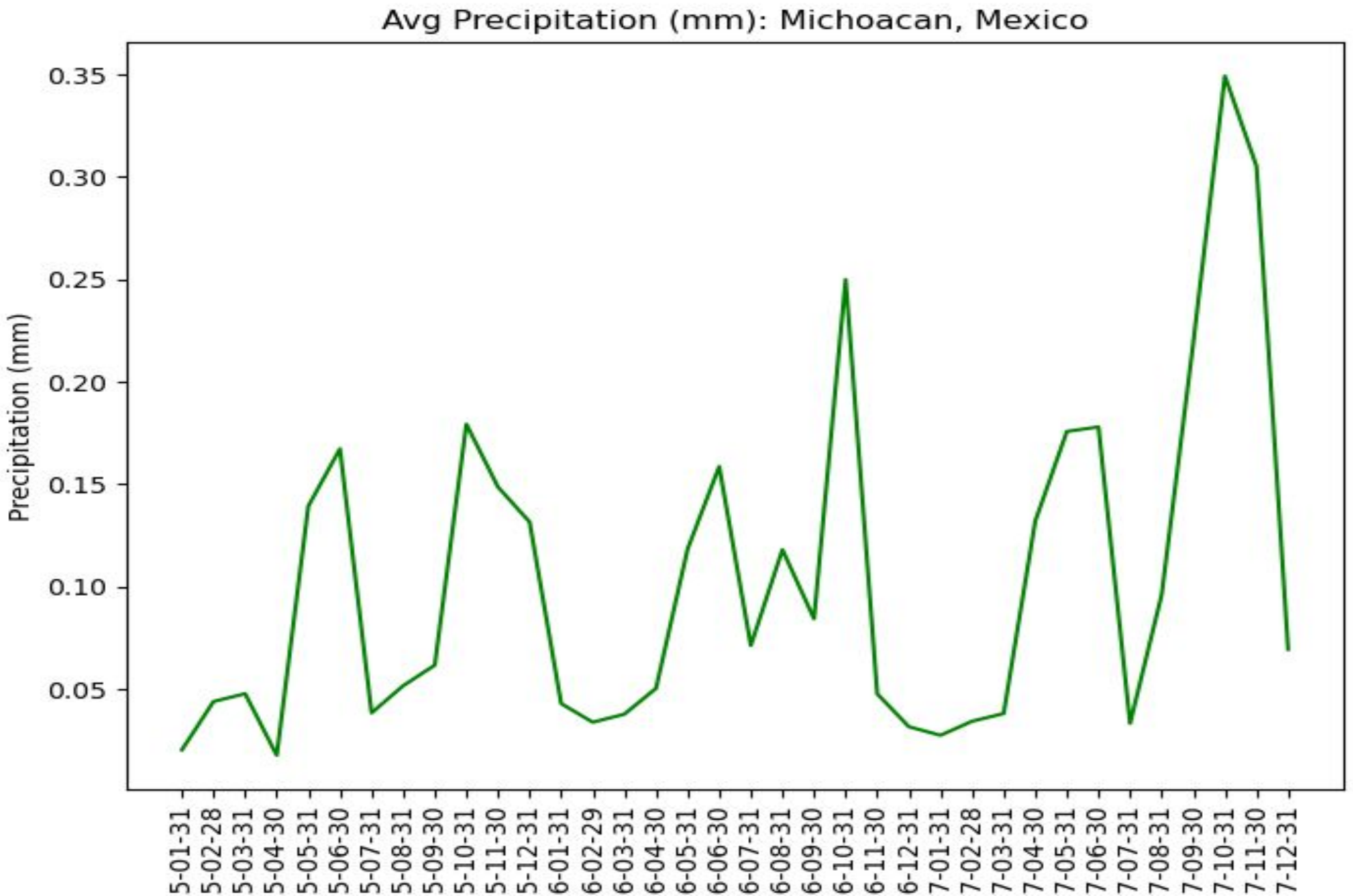
7-09-30
7-10-31
7-11-30
7-12-31


Avg Precipitation (mm): Michoacan, Mexico
Precipitation (mm)
0.35
0.30
0.25
0.20
0.15
0.10
0.05
5-01-31
5-02-28
5-03-31
5-04-30
5-05-31
5-06-30
5-07-31
5-08-31
5-09-30
5-10-31
5-11-30
5-12-31
6-01-31
6-02-29
6-03-31
6-04-30
6-05-31
6-06-30
6-07-31
6-08-31
6-09-30
6-10-31
6-11-30
6-12-31
7-01-31
7-02-28
7-03-31
7-04-30
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7-06-30
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7-09-30
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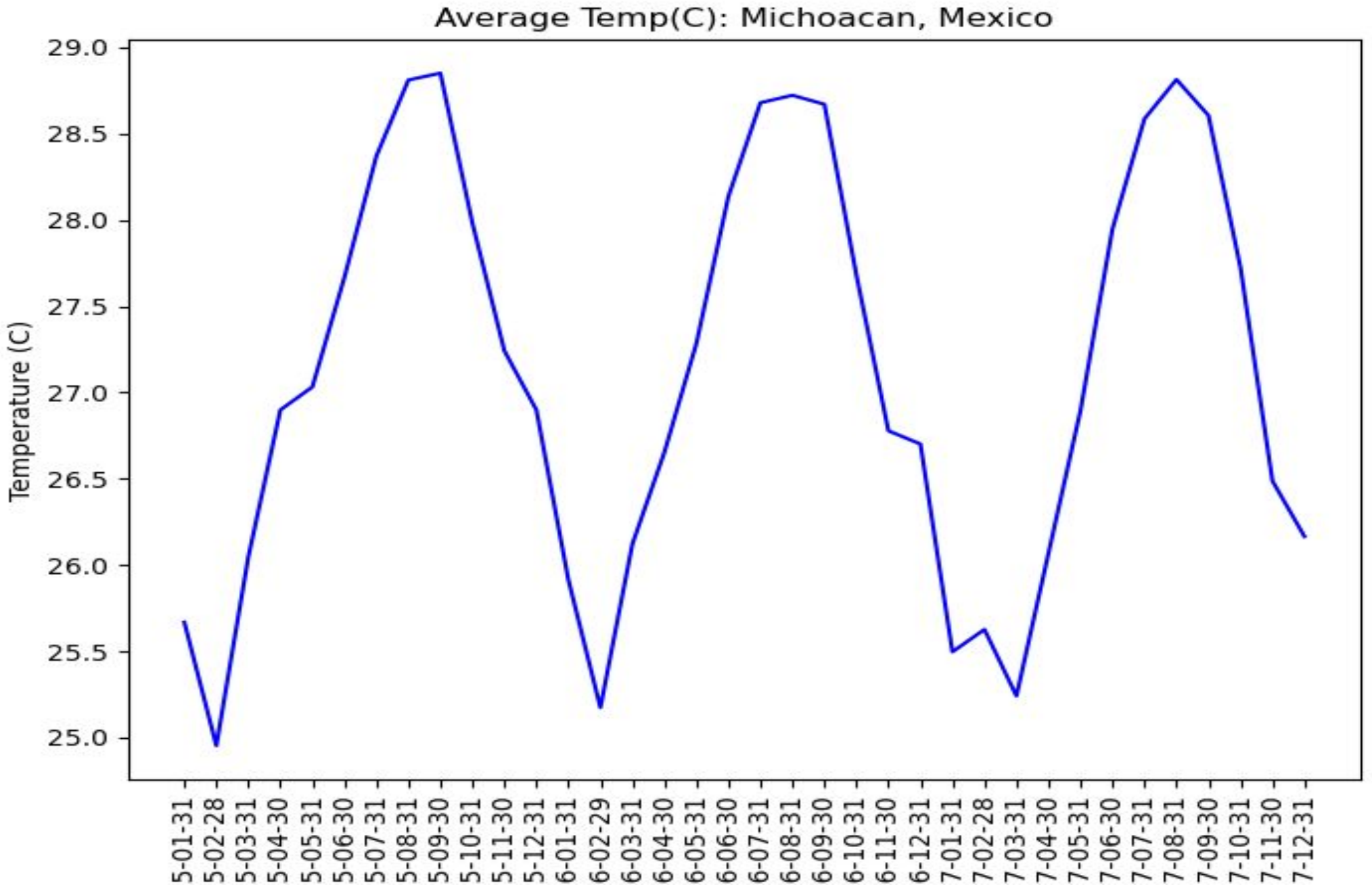
7-11-30
7-12-31


Average Temp(C): Michoacan, Mexico
Temperature (C)
29.0
28.5
28.0
27.5
27.0
26.5
26.0
25.5
25.0
5-01-31
5-02-28
5-03-31
5-04-30
5-05-31
5-06-30
5-07-31
5-08-31
5-09-30
5-10-31
5-11-30
5-12-31
6-01-31
6-02-29
6-03-31
6-04-30
6-05-31
6-06-30
6-07-31
6-08-31
6-09-30
6-10-31
6-11-30
6-12-31
7-01-31
7-02-28
7-03-31
7-04-30
7-05-31
7-06-30
7-07-31
7-08-31
7-09-30
7-10-31
7-11-30
7-12-31

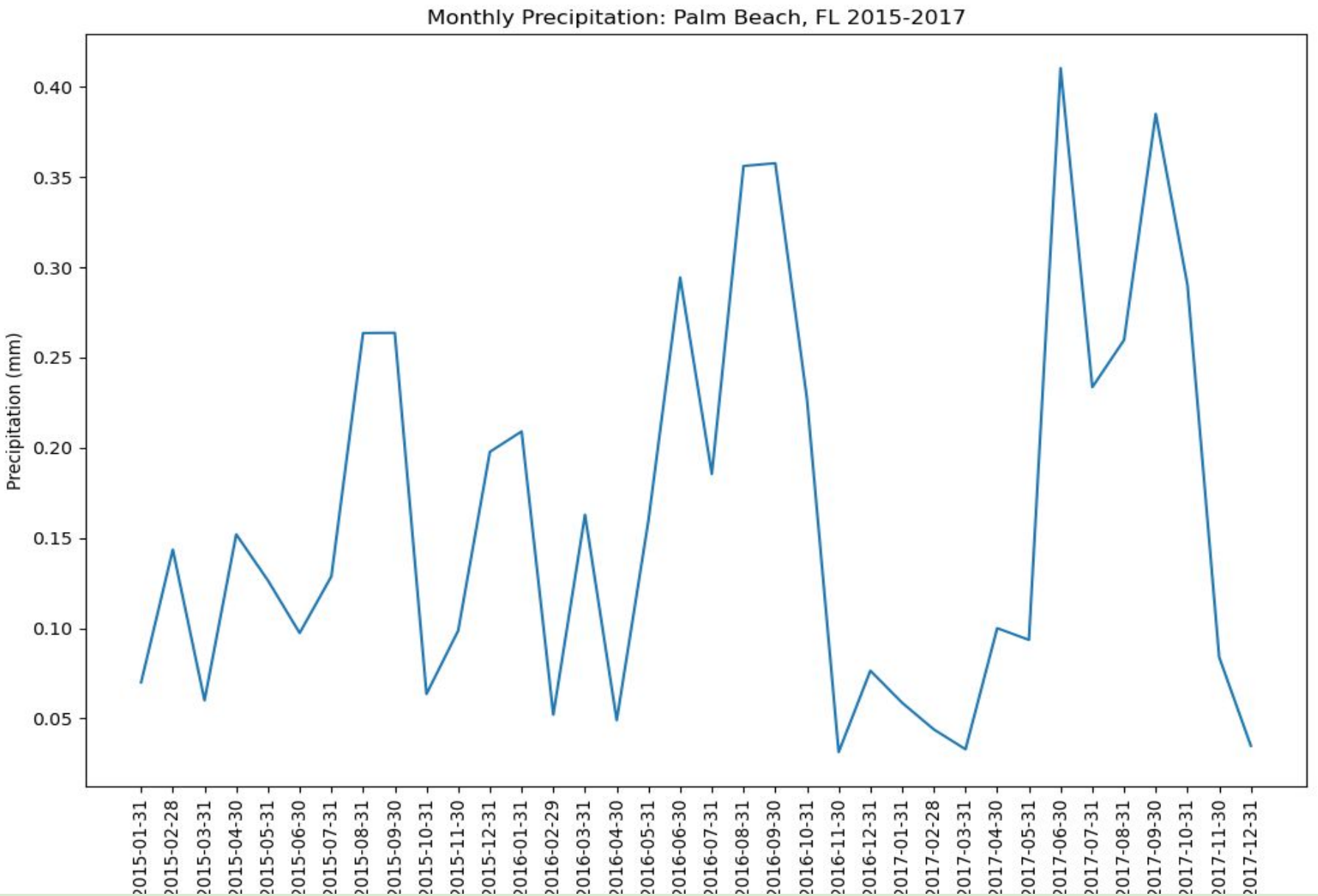
Analysis

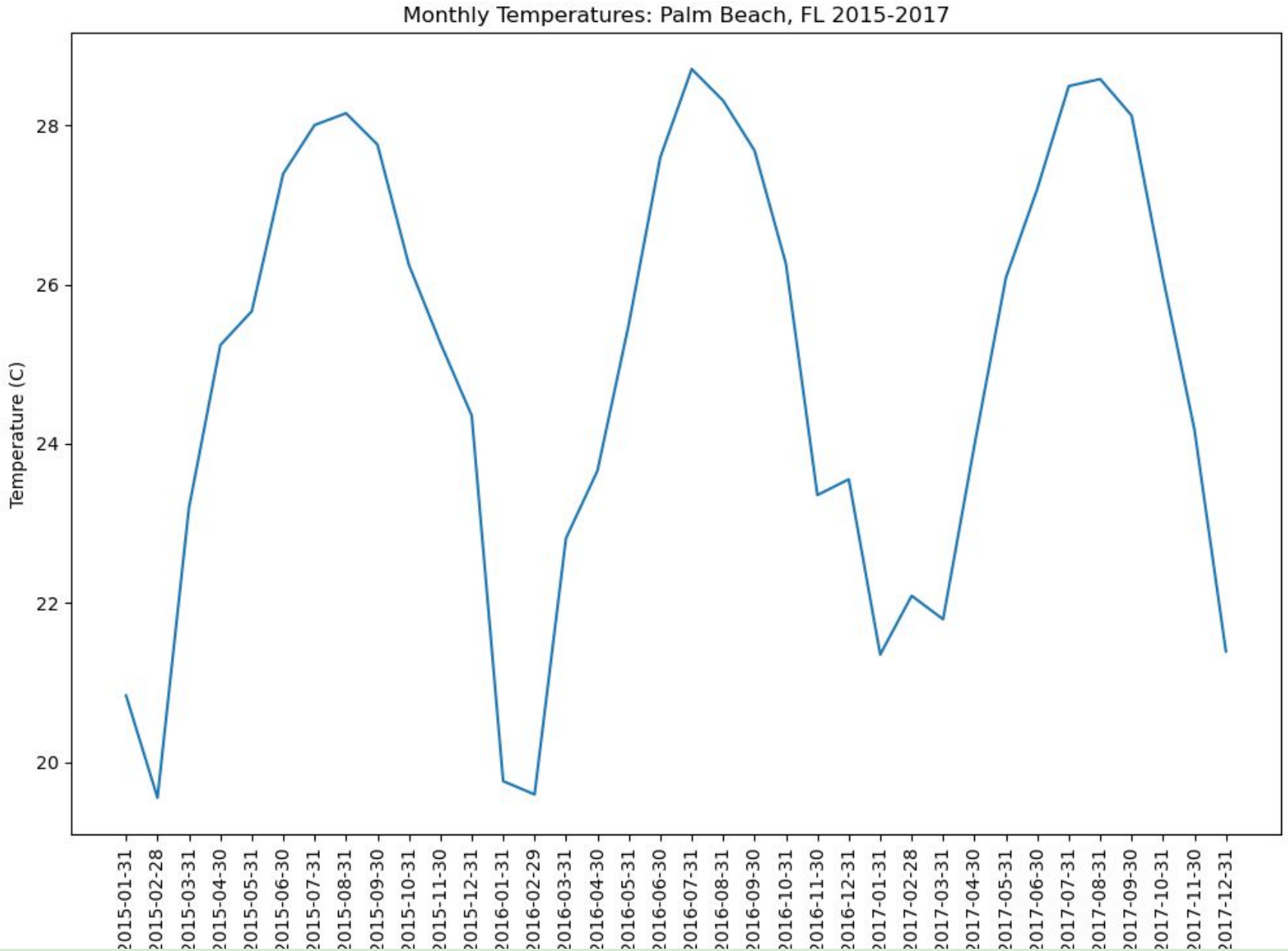
- In general, we see temperatures ranging from 20C to 29C in current growing regions in California and Mexico during the spring, summer, and early autumn.

- Precipitation between 0.15mm and 0.40 mm are seen in both growing regions.

Similar Growing Regions

- 3 Potential alternate growing regions based on climate type (mediterranean, tropical):
  - Palm Beach, Florida
  - Corpus Christi, TX
  - Iberville, Louisiana


Monthly Precipitation: Palm Beach, FL 2015-2017
Precipitation (mm)
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
2015-01-31
2015-02-28
2015-03-31
2015-04-30
2015-05-31
2015-06-30
2015-07-31
2015-08-31
2015-09-30
2015-10-31
2015-11-30
2015-12-31
2016-01-31
2016-02-29
2016-03-31
2016-04-30
2016-05-31
2016-06-30
2016-07-31
2016-08-31
2016-09-30
2016-10-31
2016-11-30
2016-12-31
2017-01-31
2017-02-28
2017-03-31
2017-04-30
2017-05-31
2017-06-30
2017-07-31
2017-08-31
2017-09-30
2017-10-31
2017-11-30
2017-12-31


Monthly Temperatures: Palm Beach, FL 2015-2017
Temperature (C)
28
26
24
22
20
2015-01-31
2015-02-28
2015-03-31
2015-04-30
2015-05-31
2015-06-30
2015-07-31
2015-08-31
2015-09-30
2015-10-31
2015-11-30
2015-12-31
2016-01-31
2016-02-29
2016-03-31
2016-04-30
2016-05-31
2016-06-30
2016-07-31
2016-08-31
2016-09-30
2016-10-31
2016-11-30
2016-12-31
2017-01-31
2017-02-28
2017-03-31
2017-04-30
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2017-06-30
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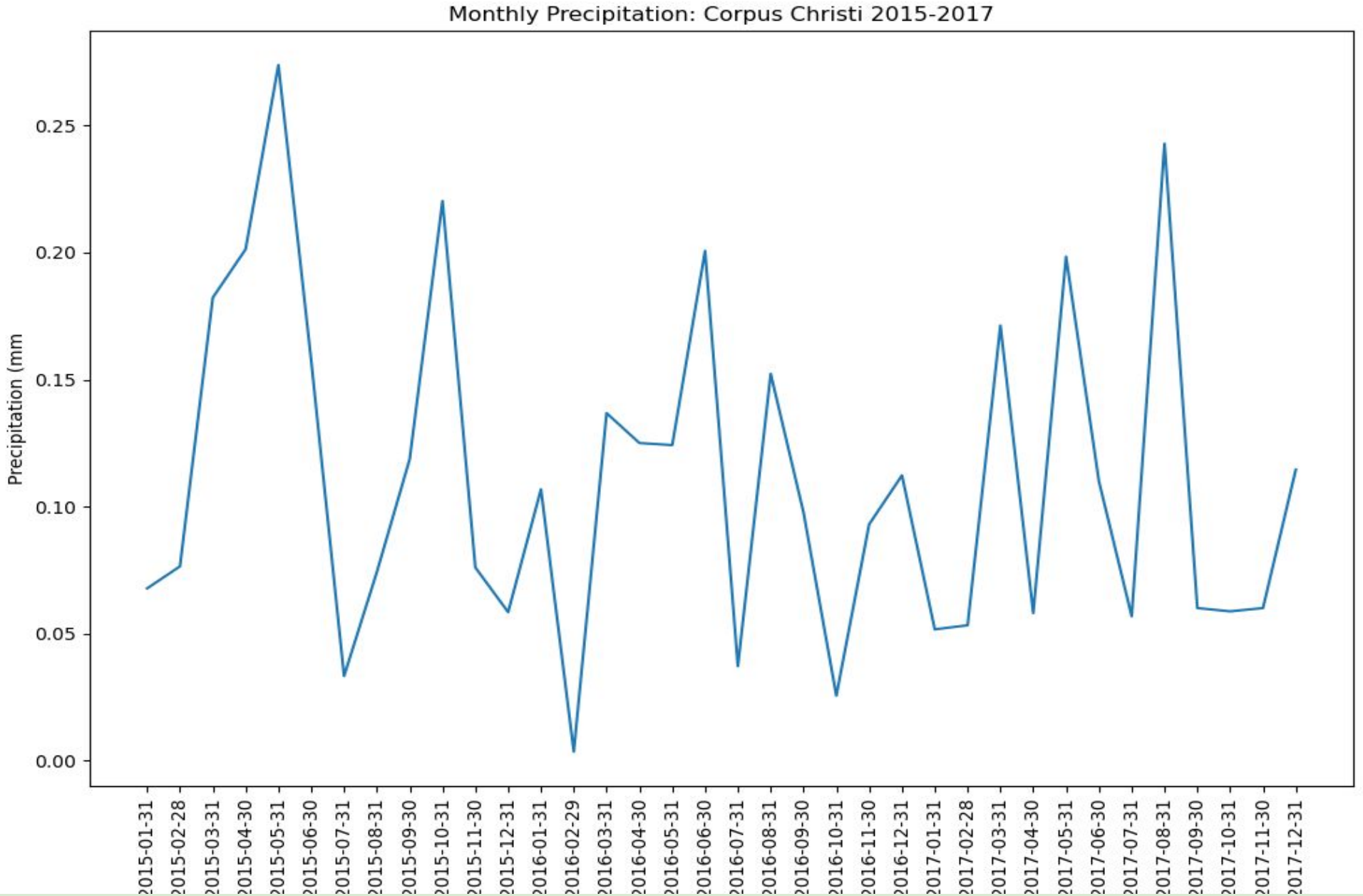
2017-09-30
2017-10-31
2017-11-30
2017-12-31


Monthly Precipitation: Corpus Christi 2015-2017
Precipitation (mm
0.25
0.20
0.15
0.10
0.05
0.00
2015-01-31
2015-02-28
2015-03-31
2015-04-30
2015-05-31
2015-06-30
2015-07-31
2015-08-31
2015-09-30
2015-10-31
2015-11-30
2015-12-31
2016-01-31
2016-02-29
2016-03-31
2016-04-30
2016-05-31
2016-06-30
2016-07-31
2016-08-31
2016-09-30
2016-10-31
2016-11-30
2016-12-31
2017-01-31
2017-02-28
2017-03-31
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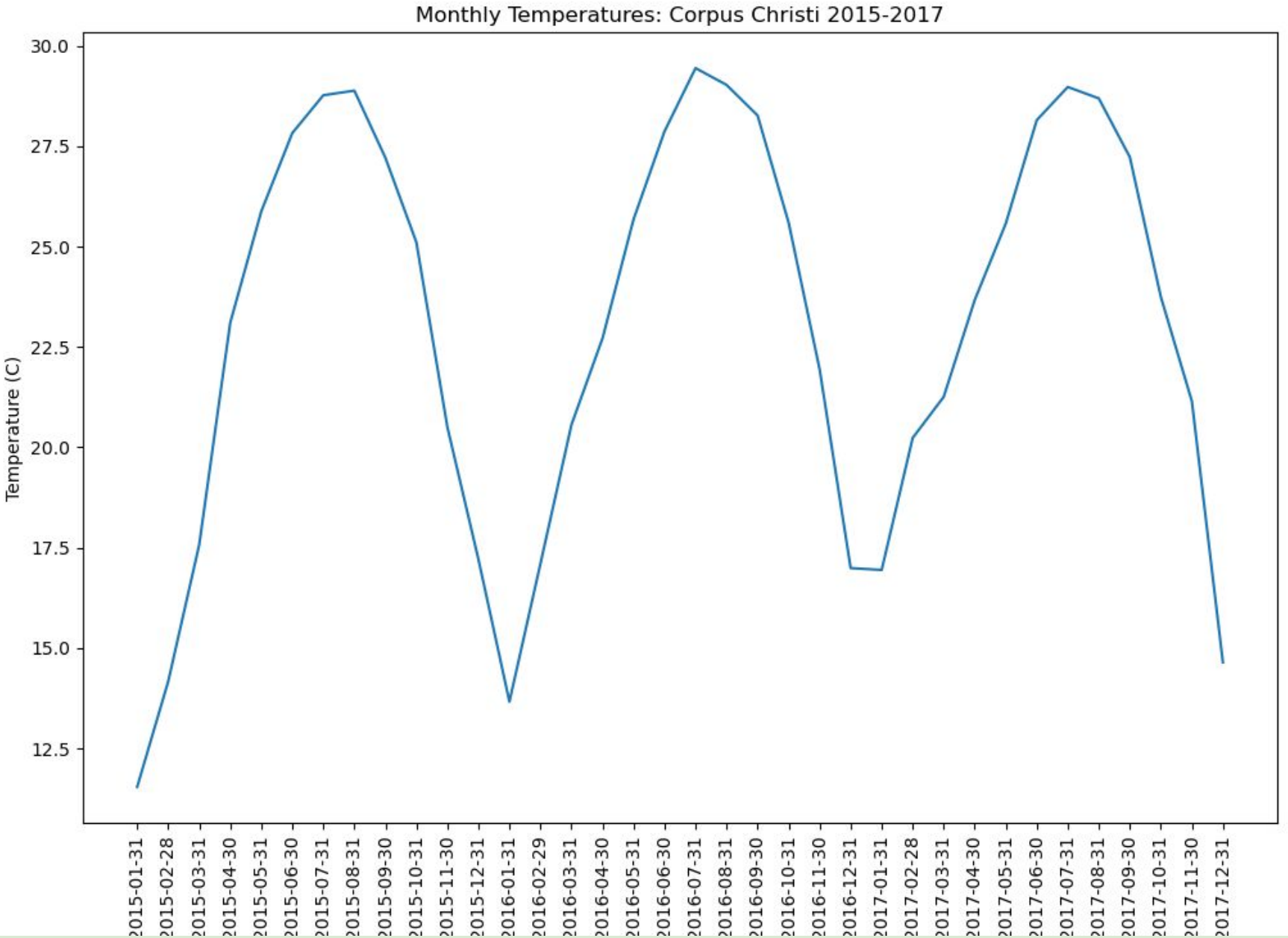
2017-09-30
2017-10-31
2017-11-30
2017-12-31


Monthly Temperatures: Corpus Christi 2015-2017
Temperature (C)
30.0
27.5
25.0
22.5
20.0
17.5
15.0
12.5
2015-01-31
2015-02-28
2015-03-31
2015-04-30
2015-05-31
2015-06-30
2015-07-31
2015-08-31
2015-09-30
2015-10-31
2015-11-30
2015-12-31
2016-01-31
2016-02-29
2016-03-31
2016-04-30
2016-05-31
2016-06-30
2016-07-31
2016-08-31
2016-09-30
2016-10-31
2016-11-30
2016-12-31
2017-01-31
2017-02-28
2017-03-31
2017-04-30
2017-05-31
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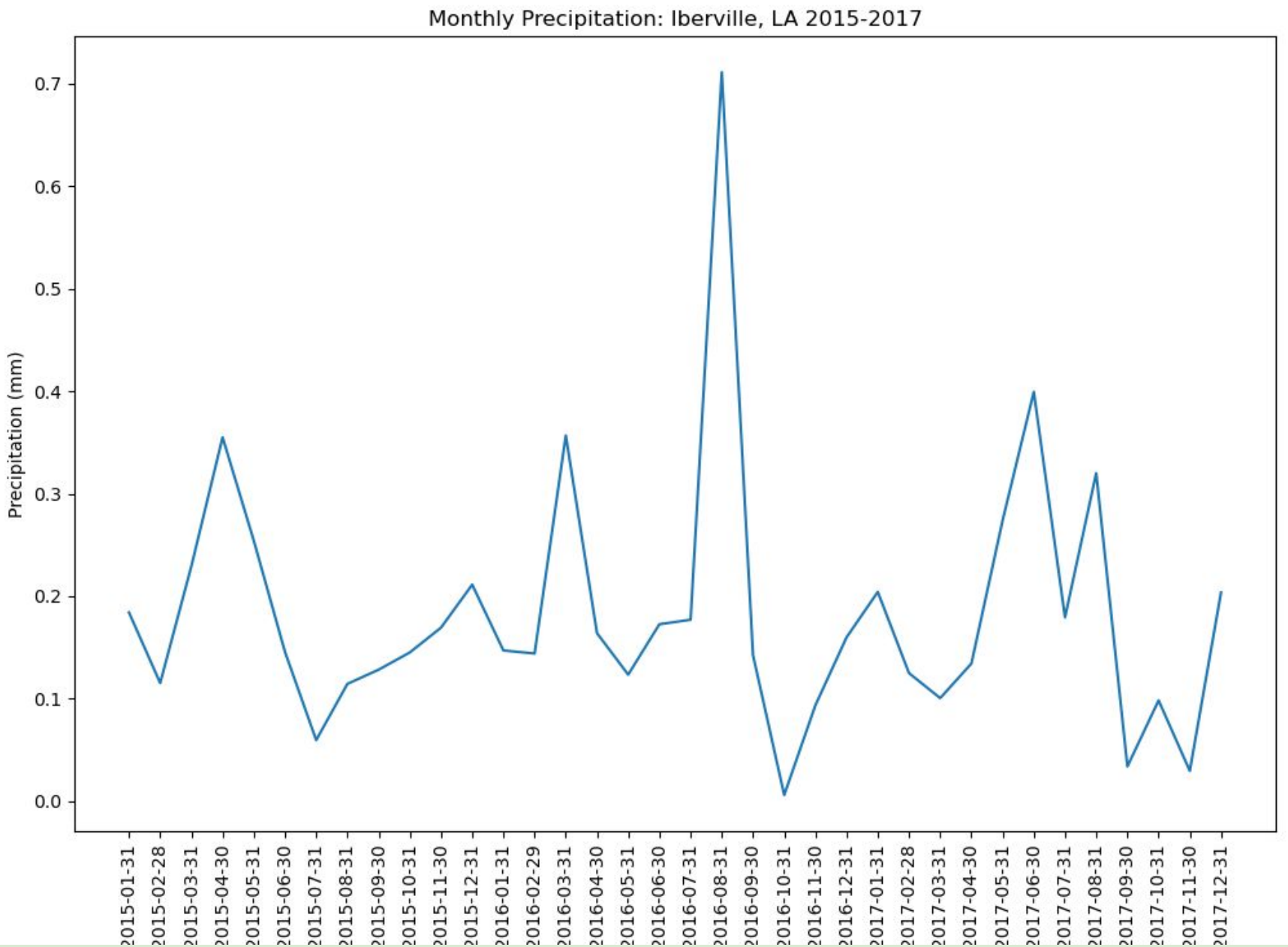
2017-09-30
2017-10-31
2017-11-30
2017-12-31


Monthly Precipitation: Iberville, LA 2015-2017
Precipitation (mm)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
2015-01-31
2015-02-28
2015-03-31
2015-04-30
2015-05-31
2015-06-30
2015-07-31
2015-08-31
2015-09-30
2015-10-31
2015-11-30
2015-12-31
2016-01-31
2016-02-29
2016-03-31
2016-04-30
2016-05-31
2016-06-30
2016-07-31
2016-08-31
2016-09-30
2016-10-31
2016-11-30
2016-12-31
2017-01-31
2017-02-28
2017-03-31
2017-04-30
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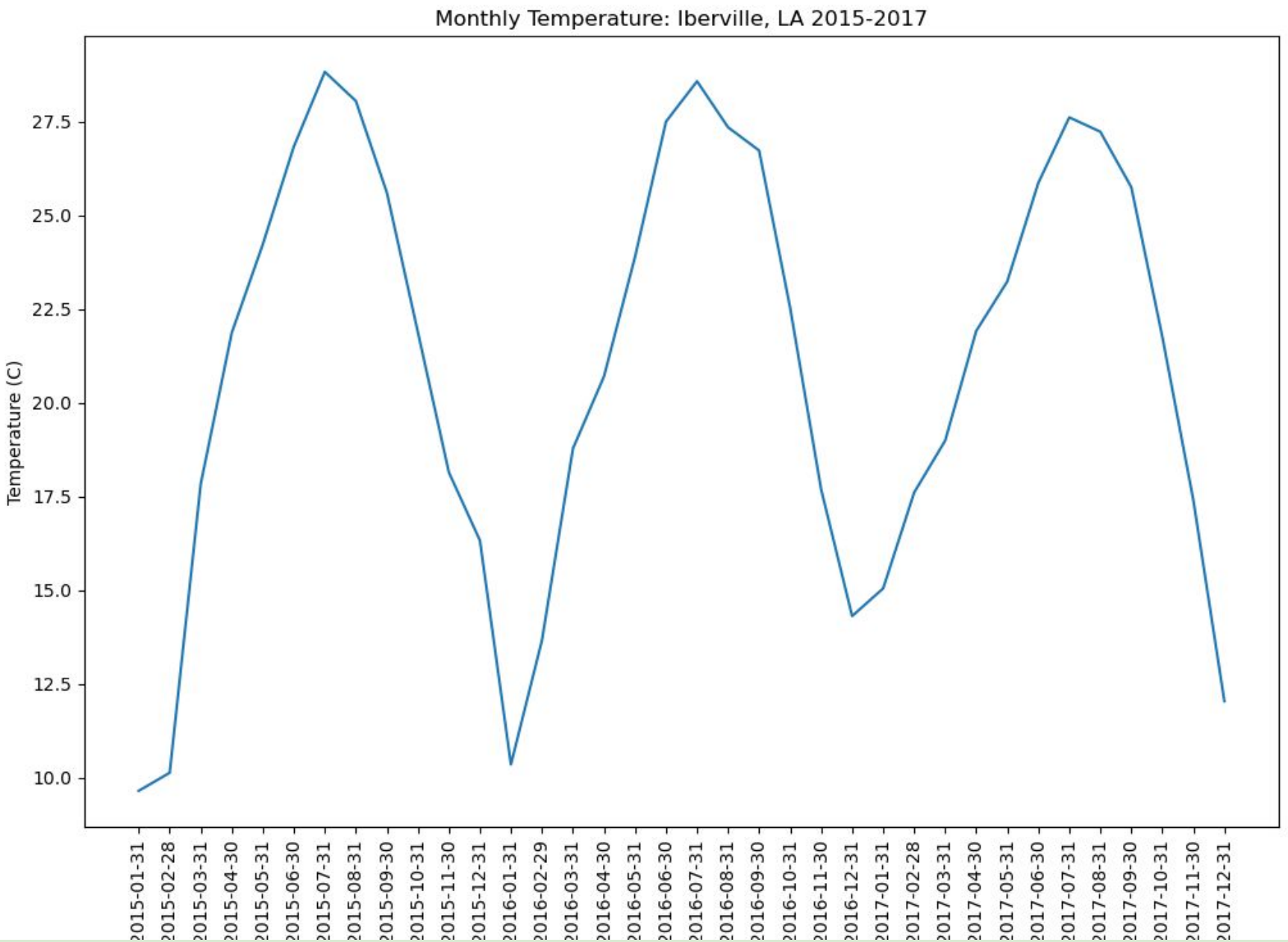
2017-09-30
2017-10-31
2017-11-30
2017-12-31

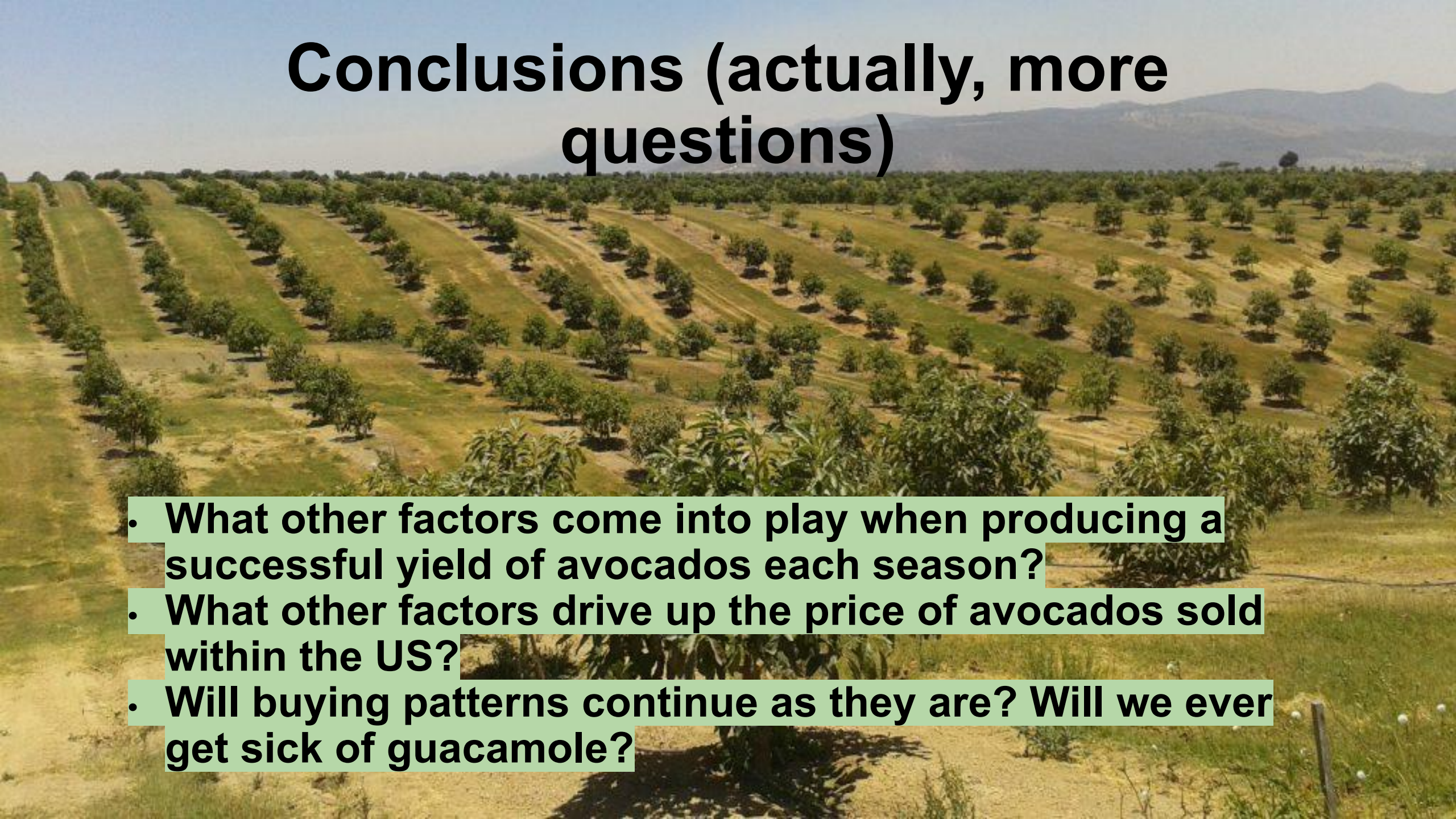

Monthly Temperature: Iberville, LA 2015-2017
Temperature (C)
27.5
25.0
22.5
20.0
17.5
15.0
12.5
10.0
2015-01-31
2015-02-28
2015-03-31
2015-04-30
2015-05-31
2015-06-30
2015-07-31
2015-08-31
2015-09-30
2015-10-31
2015-11-30
2015-12-31
2016-01-31
2016-02-29
2016-03-31
2016-04-30
2016-05-31
2016-06-30
2016-07-31
2016-08-31
2016-09-30
2016-10-31
2016-11-30
2016-12-31
2017-01-31
2017-02-28
2017-03-31
2017-04-30
2017-05-31
2017-06-30
2017-07-31
2017-08-31
2017-09-30
2017-10-31
2017-11-30
2017-12-31

Analysis

- While all 3 regions displayed similar weather patterns during the warm months, Corpus Christi, TX bore the most similarities:
  - Avg. temp between 25C and 29C during the warm months
  - Avg. precipitation between 0.25mm and 0.40mm

- We could suggest exploring the southern coastal regions of Texas as alternate growing areas to add to the total volume of avocados sold within the US.

Conclusions (actually, more questions)



- What other factors come into play when producing a successful yield of avocados each season?
- What other factors drive up the price of avocados sold within the US?
- Will buying patterns continue as they are? Will we ever get sick of guacamole?

Sources

Avocado price data:

- https://www.kaggle.com/neuromusic/avocado-prices

Weather data:

- https://oikolab.com/

Agricultural info:

- https://www.fdacs.gov/Agriculture-Industry/Florida-Agriculture-Overview-and-Statistics
- https://www.loc.gov/resource/g4011j.ct011078/?r=0.449,0.254,0.527,0.324,0
- https://www.researchgate.net/figure/Cumulative-distribution-of-precipitation-a-and-average-annual-distribution-of_fig1_334635056