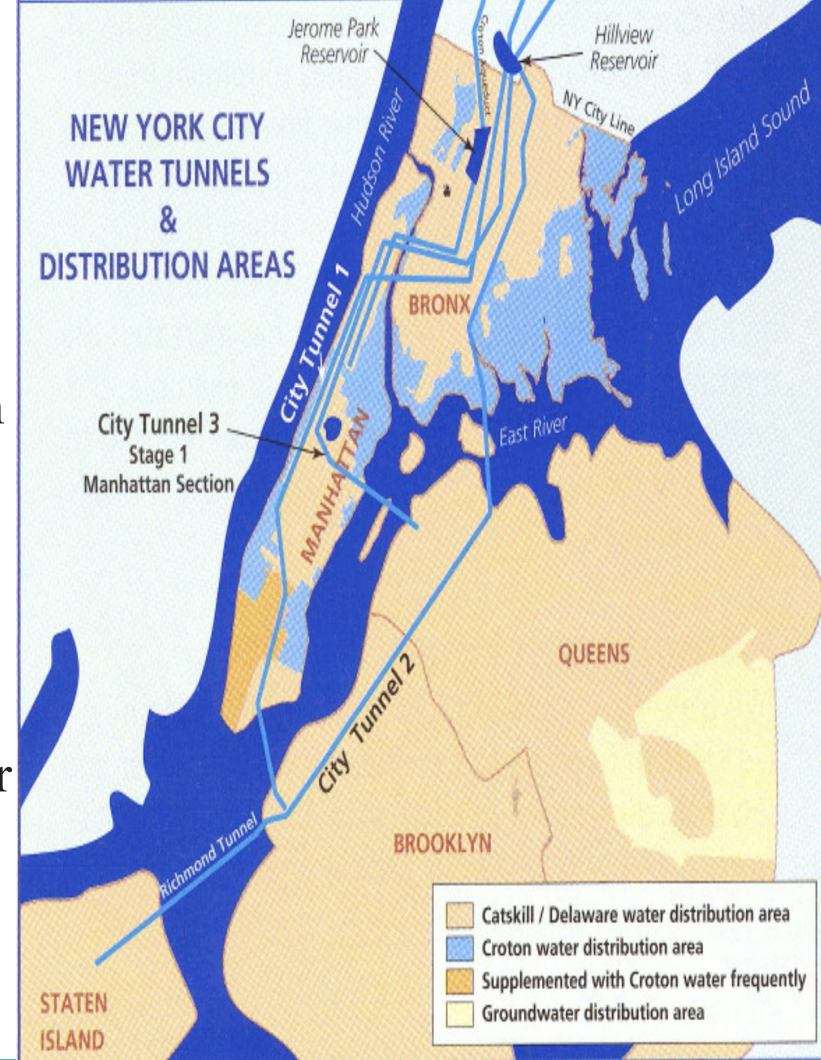# Water Use in NYCHA Buildings

-By Anil Bhusal
-under Prof Naresh Devineni

Introduction

- In the world, A child dies of waterborne diseases in every 15 seconds.
- NYC is one of the densely populated city in the World.
- It uses nearly one billions gallons of water per day.
- In 2021, The City of New York consumed average of 979 millions gallons of water per day.
- In 2022, NYCHA is home to 1 in 16 New Yorkers.

NEW YORK CITY WATER TUNNELS & DISTRIBUTION AREAS

- Catskill / Delaware water distribution area
- Croton water distribution area
- Supplemented with Croton water frequently
- Groundwater distribution area

Purpose

- Analyze water consumption and charges in public housing in NYC.
- Analyze patterns of consuming of water over nine years in each boroughs and buildings.
- Find the high consumption areas or buildings.
- Discover the relationship between NYCHA buildings over rest of the buildings for conservation of high consumption of water in NYC.
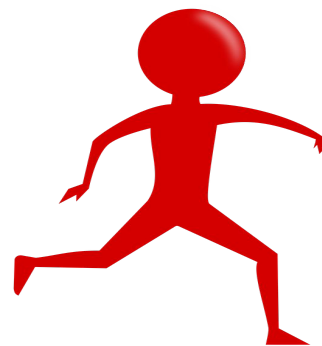
Methodologies

- Data Preparation
- Yearly analysis
- Seasonality analysis
- Extreme Consumption
- Trend Analysis
- Borough Comparison
- Solutions

Data Preparation

- Duplicate data cleaning

- Data Splitting in terms of boroughs

- For each Borough:

  - Finding each unique building in the borough

  - Setting Outliers and finding Normal Values

  - Fixing Same Date Entry

  - Data Selection (2013 -2021)

  - Removing In-sufficient data

  - Dealing with missing data

Staten Island 0.4%
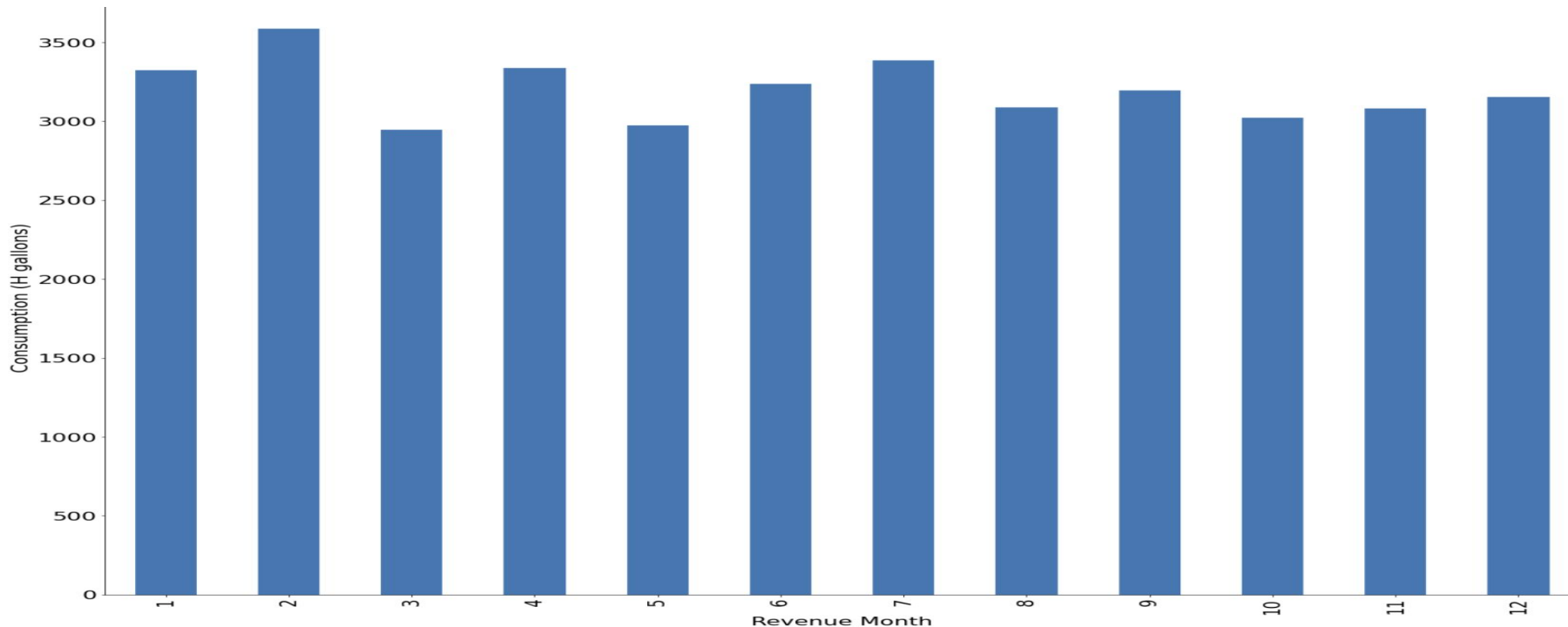Bronx 20.1%
Manhattan 26.6%
Queens 16.6%
Brooklyn 36.3%
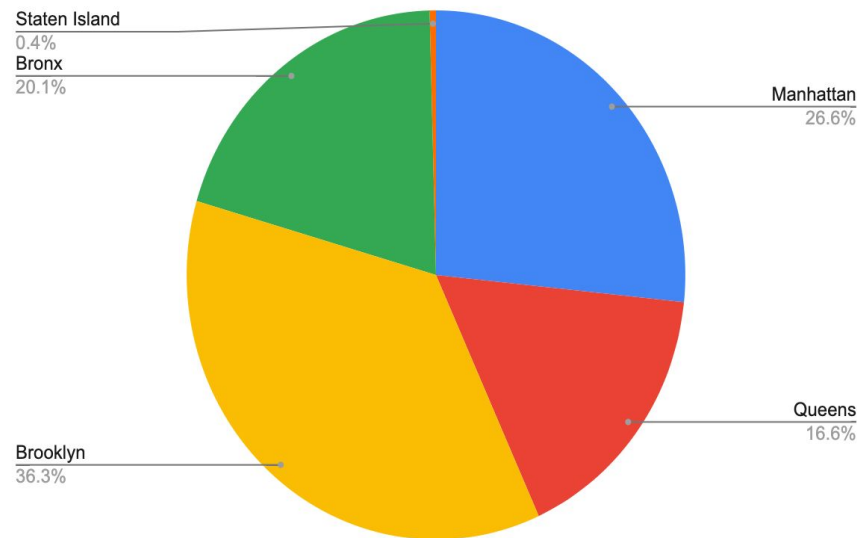
Yearly Analysis of Manhattan Data Set
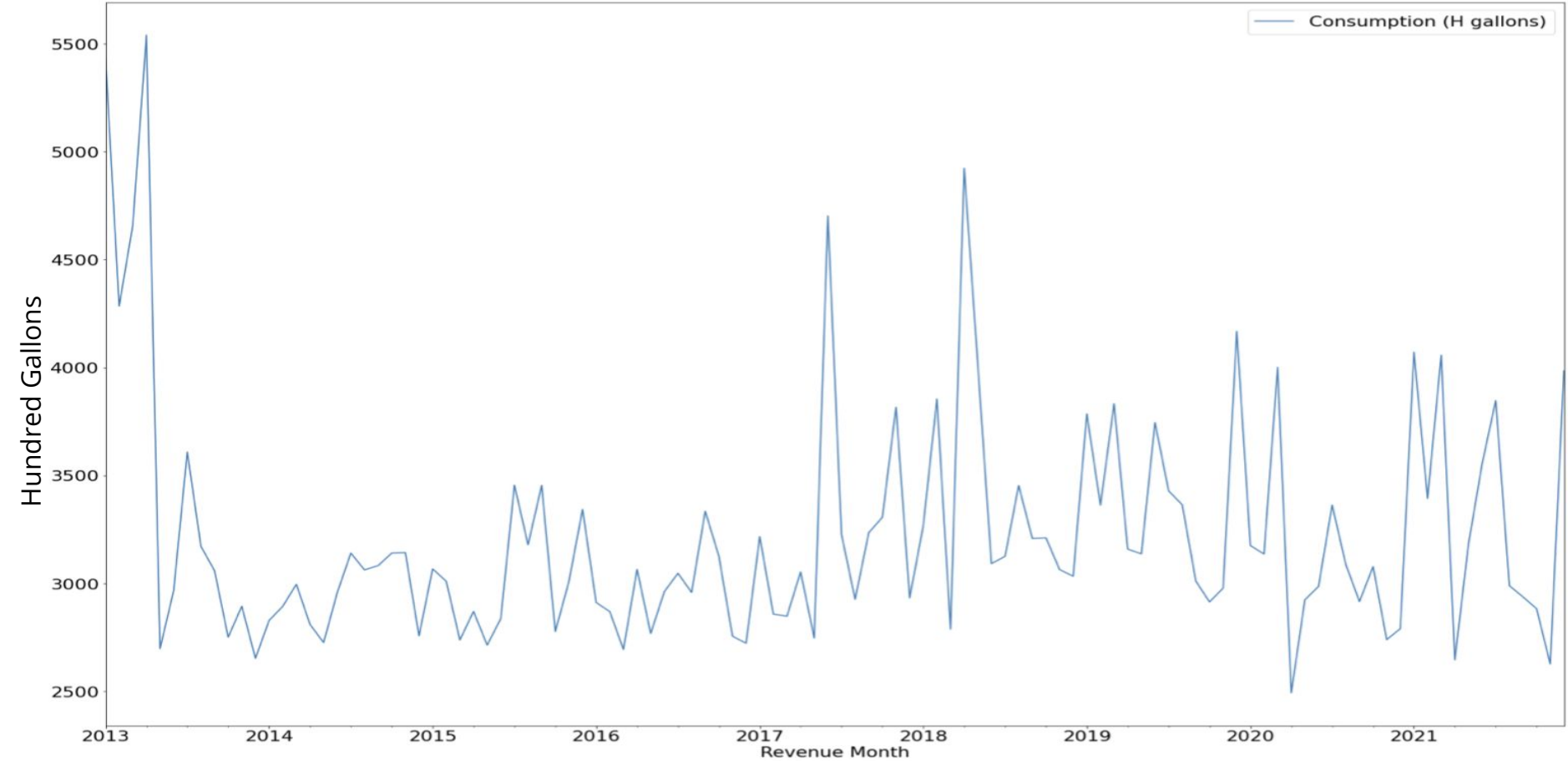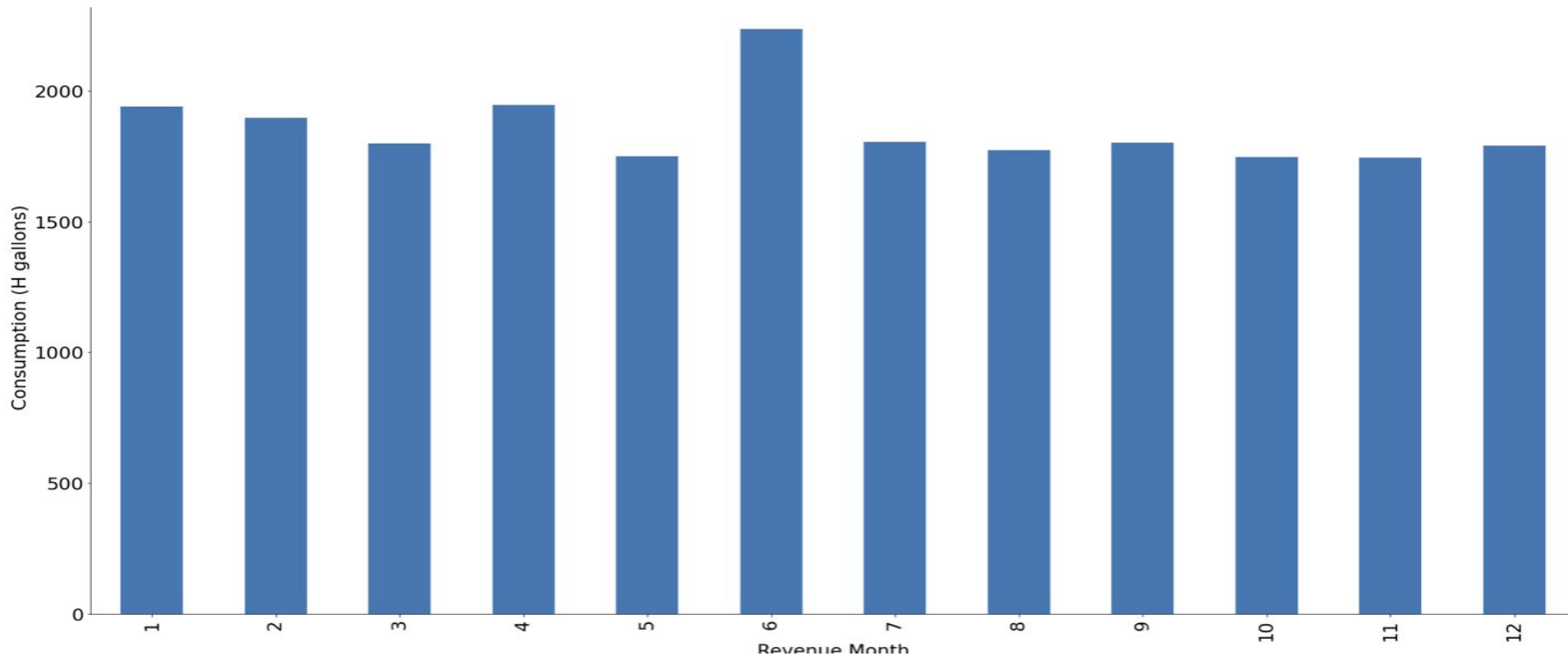
Yearly Analysis of Brooklyn Data Set
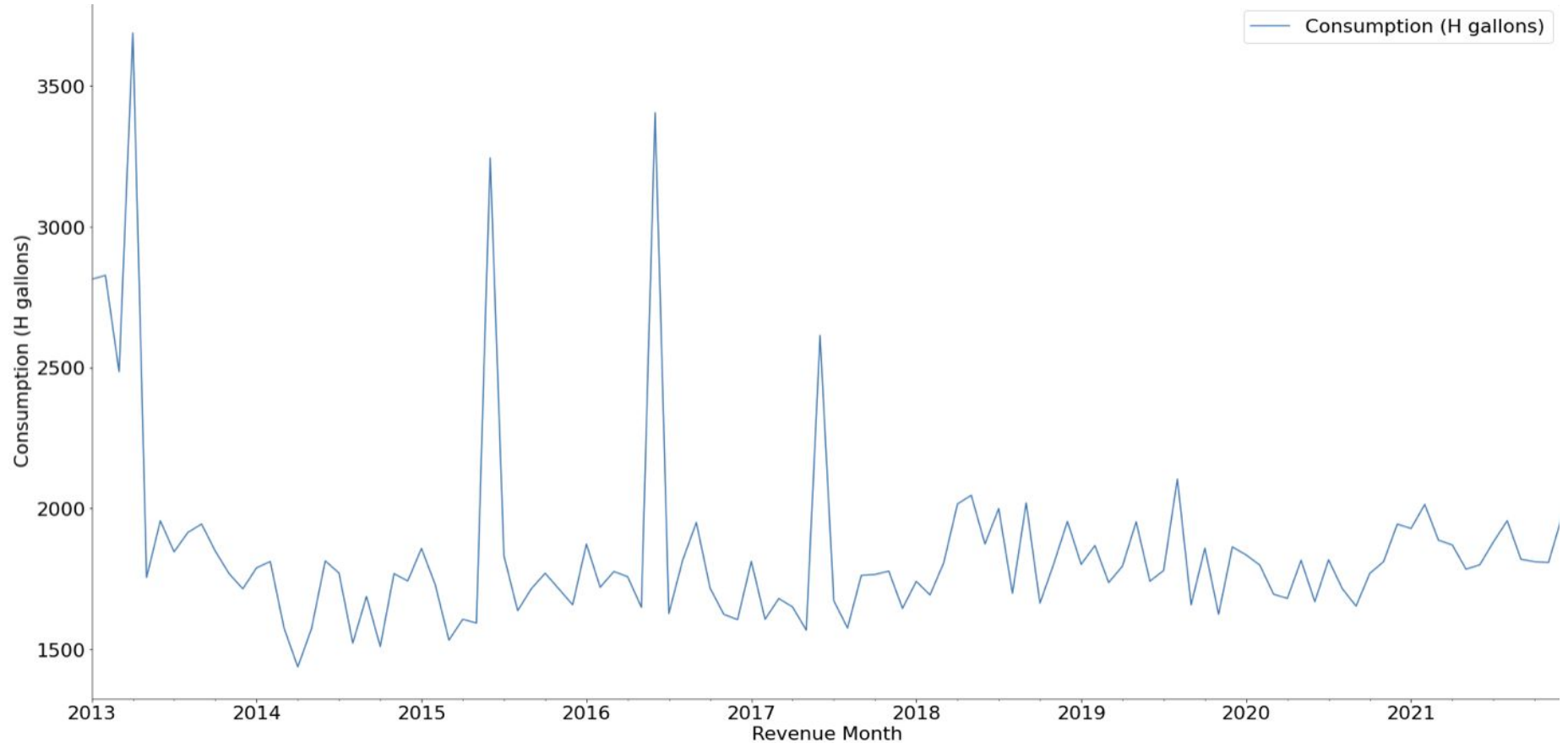
Seasonality Analysis for Manhattan

Here is the average monthly mean consumption of Manhattan dataset.

Seasonality Analysis for Brooklyn

Here is the average monthly mean consumption of Brooklyn dataset.

Extreme Consumption of Manhattan

- First, calculate the 95th percentile of each building.

- Separate highest consumed months from working data set.

- Find when does those extreme consumption occur during time frame.

- Plot them to view them graphically

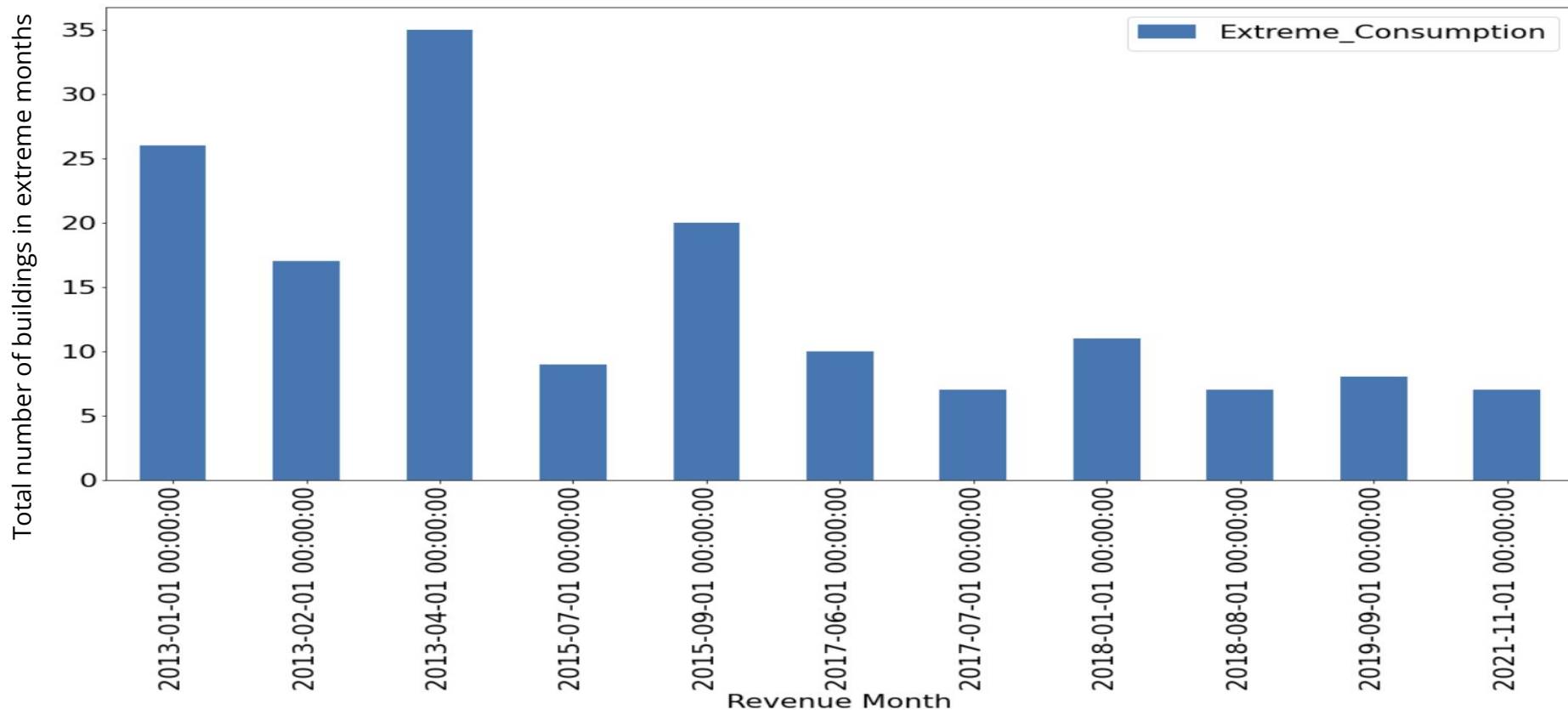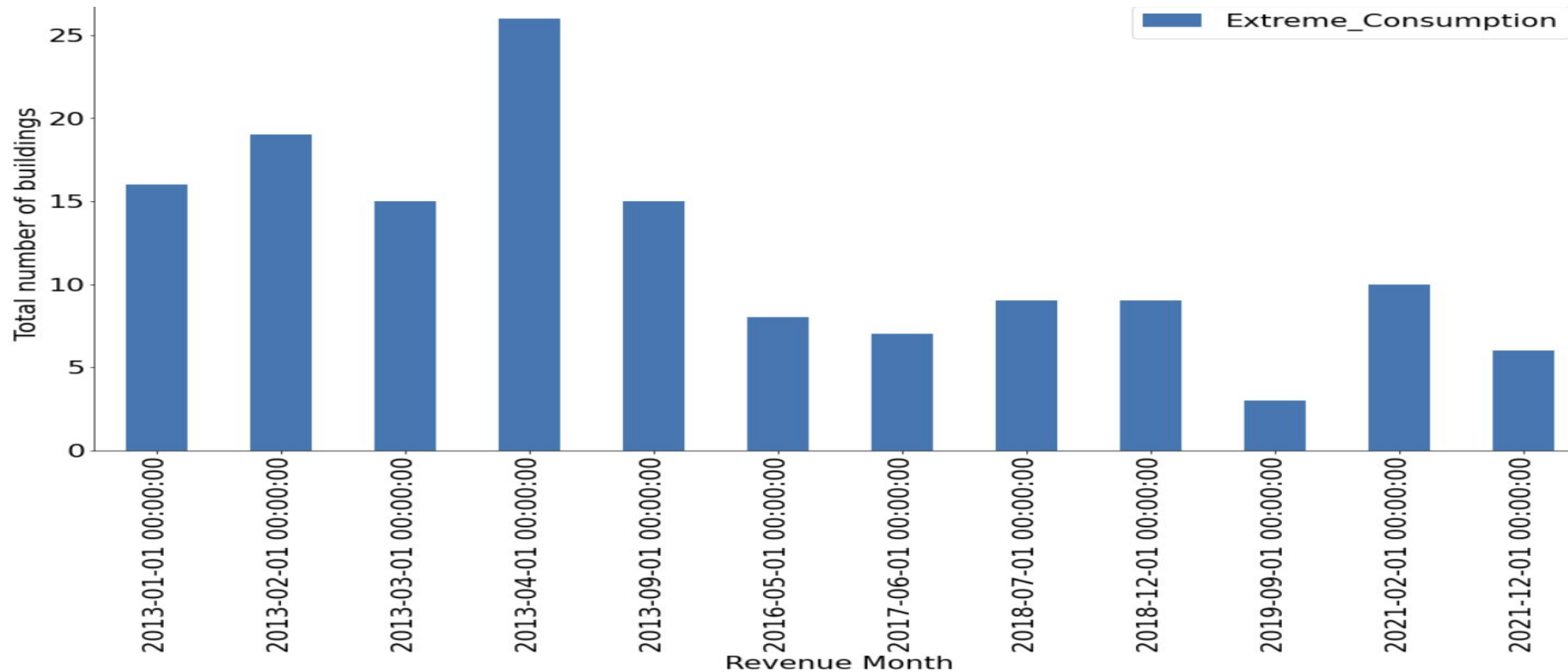- Also, find that who are contributing.

Extreme Consumption of Manhattan
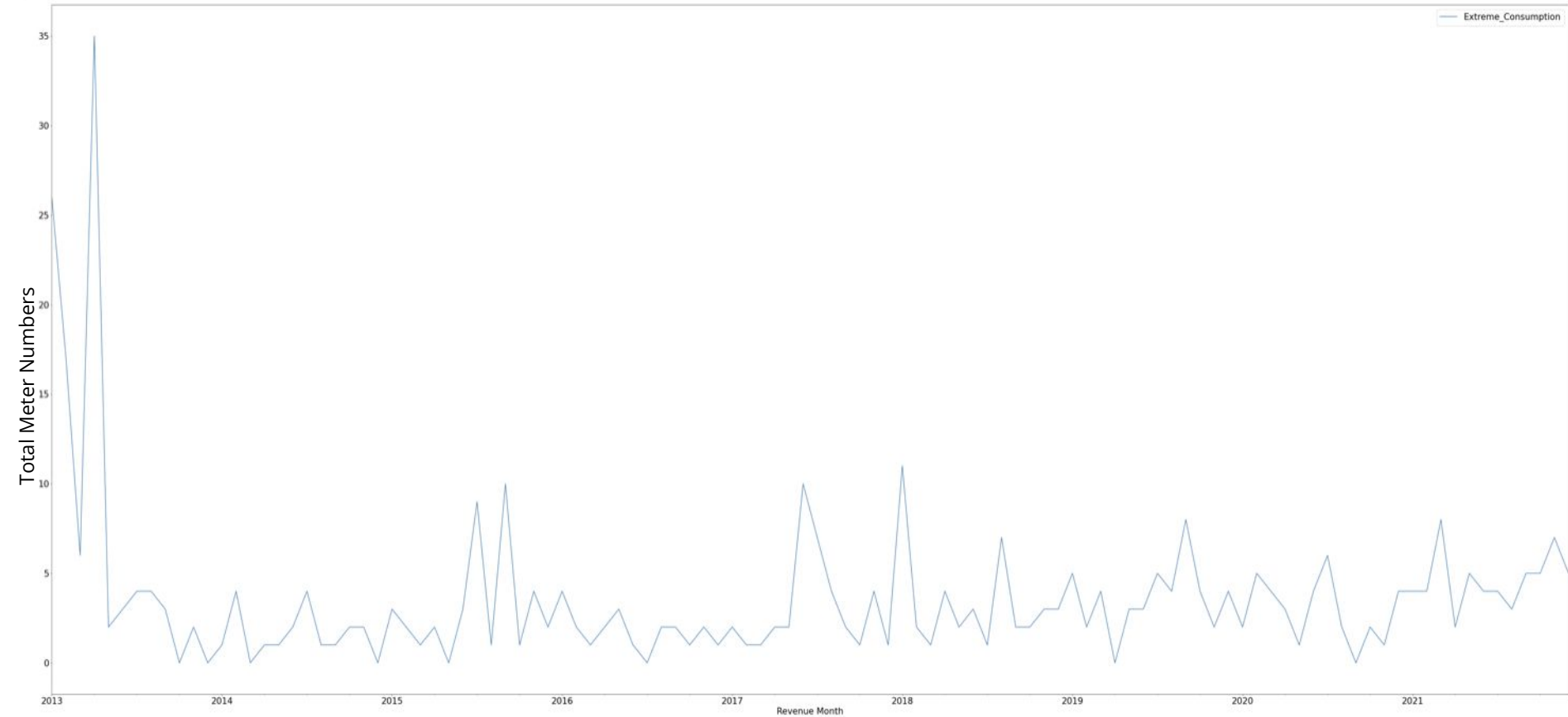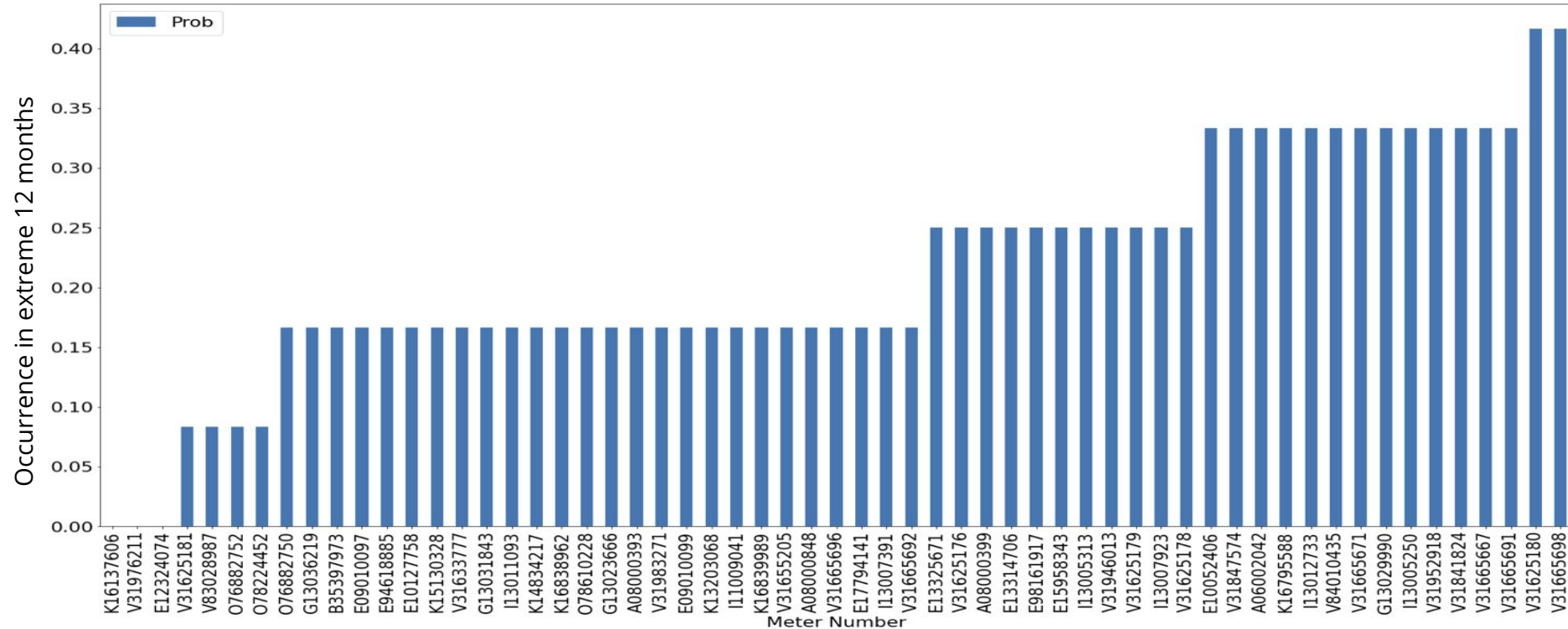
Extreme Consumption of Brooklyn
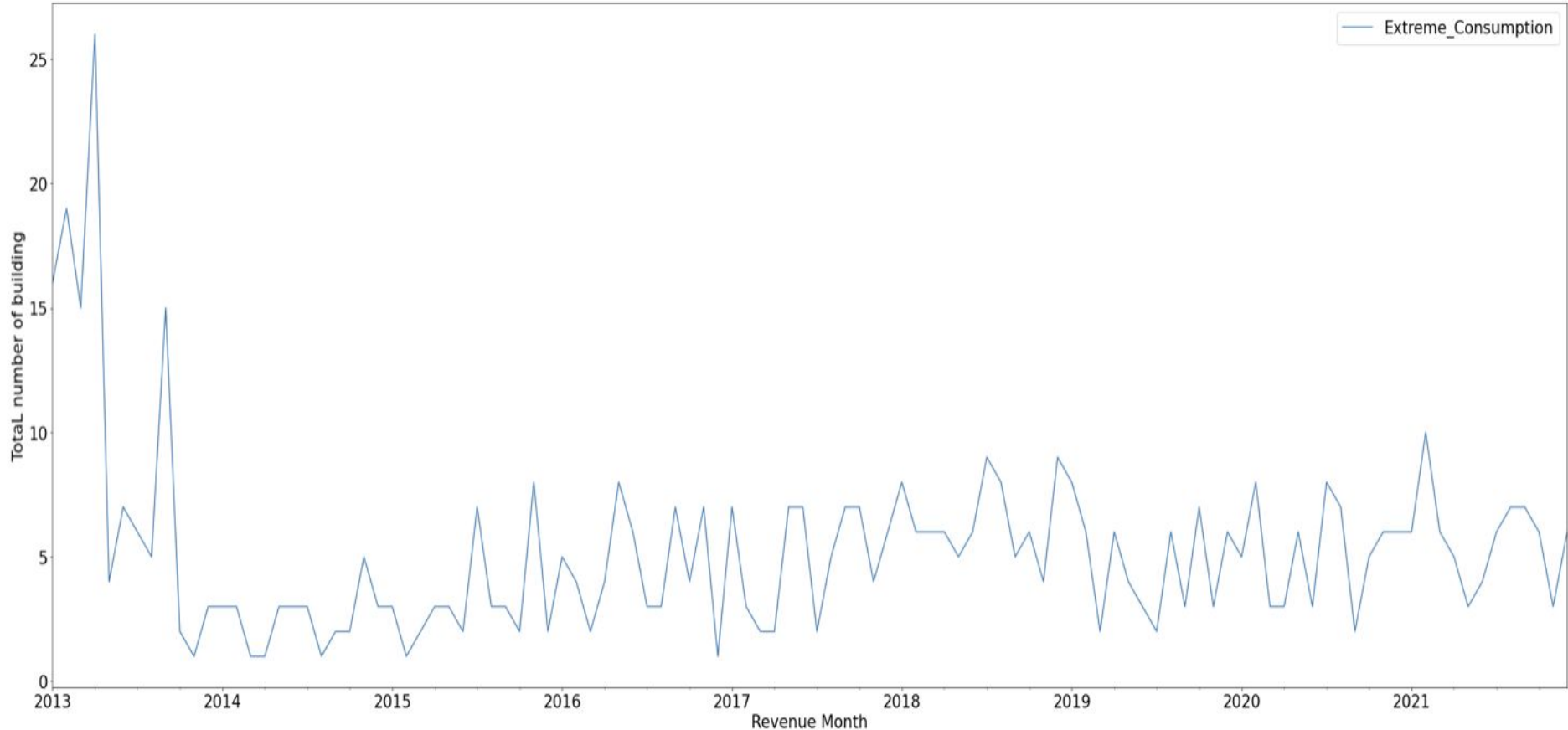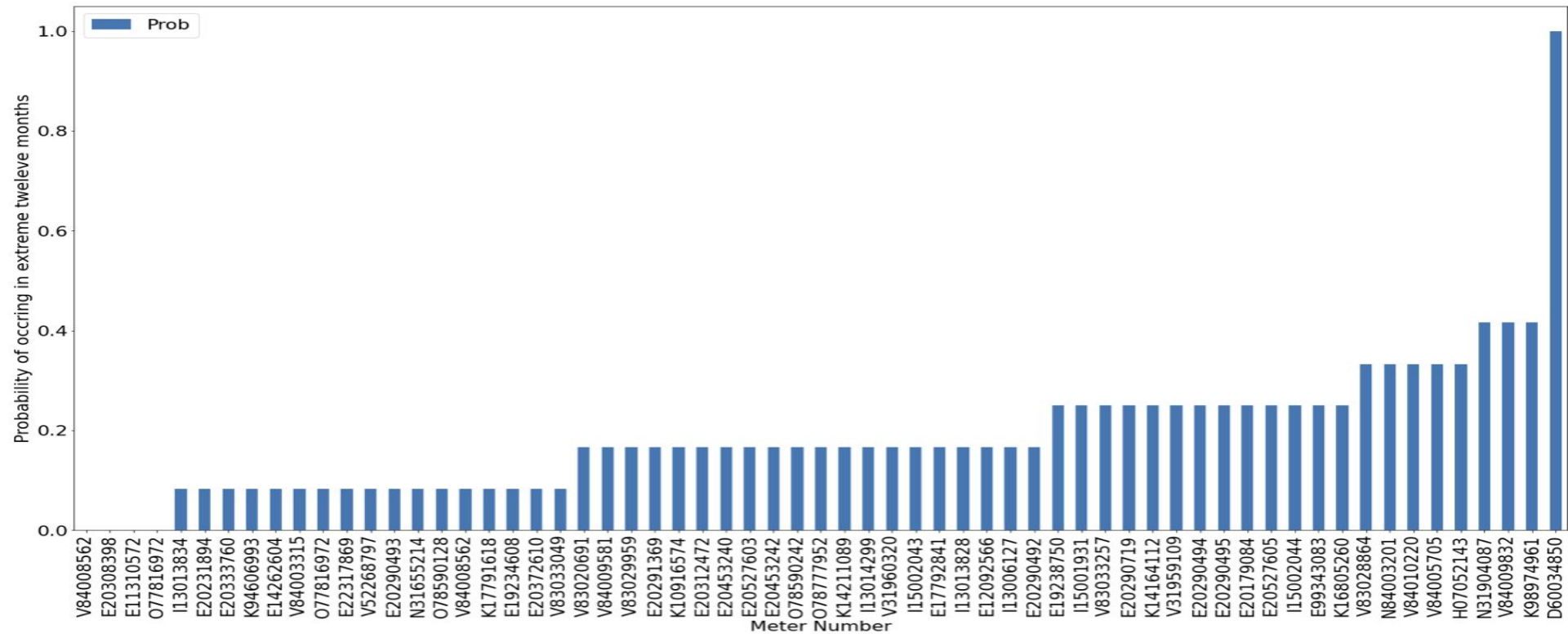
Extreme Consumption count by date (Manhattan)

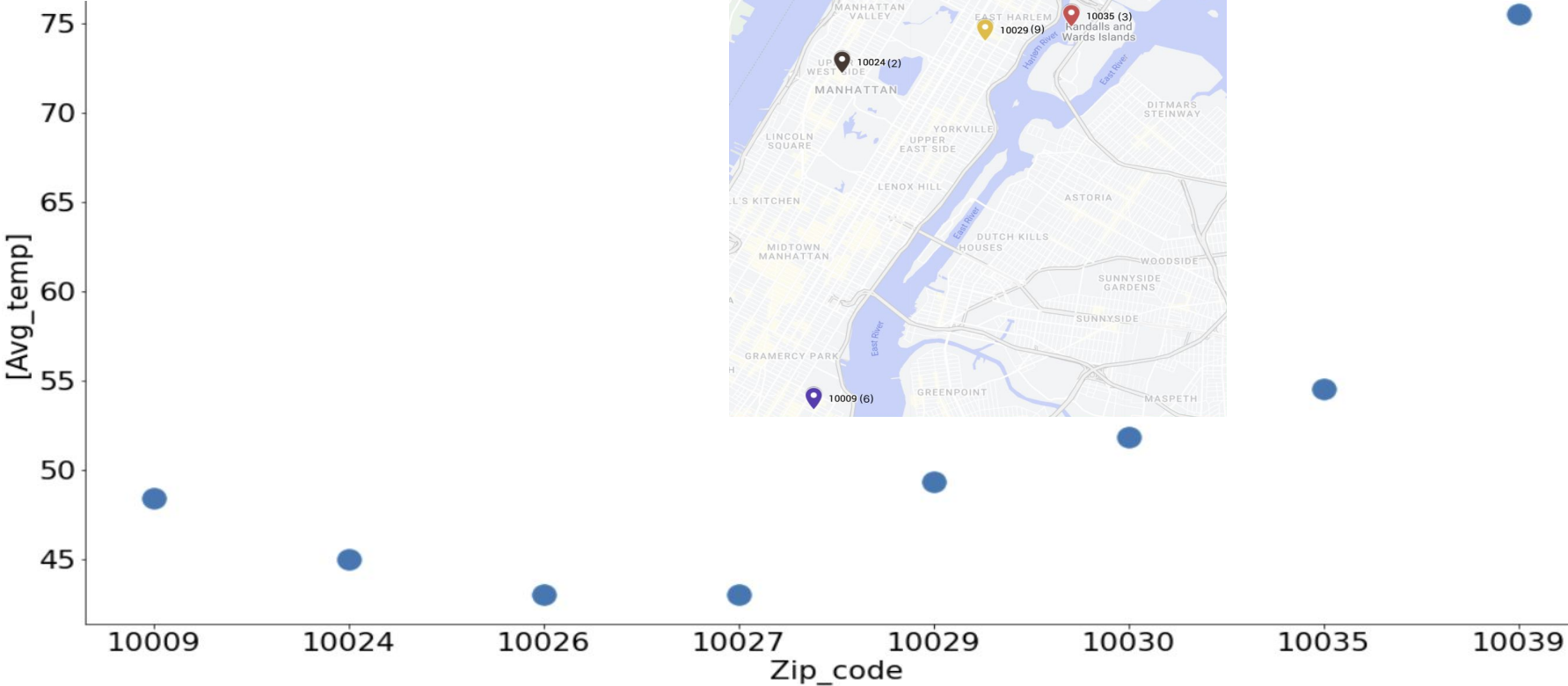# Extreme Consumption count by date(Brooklyn)

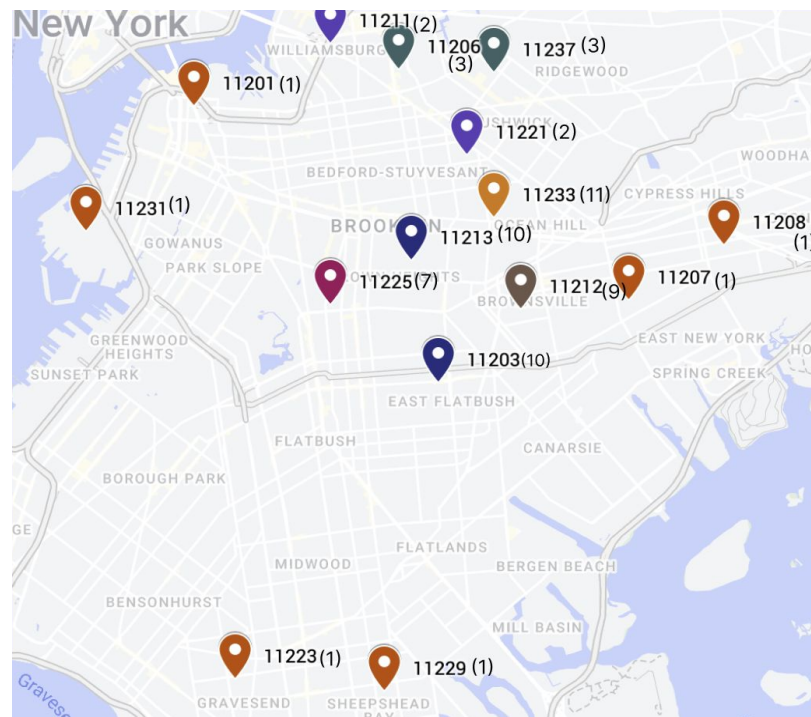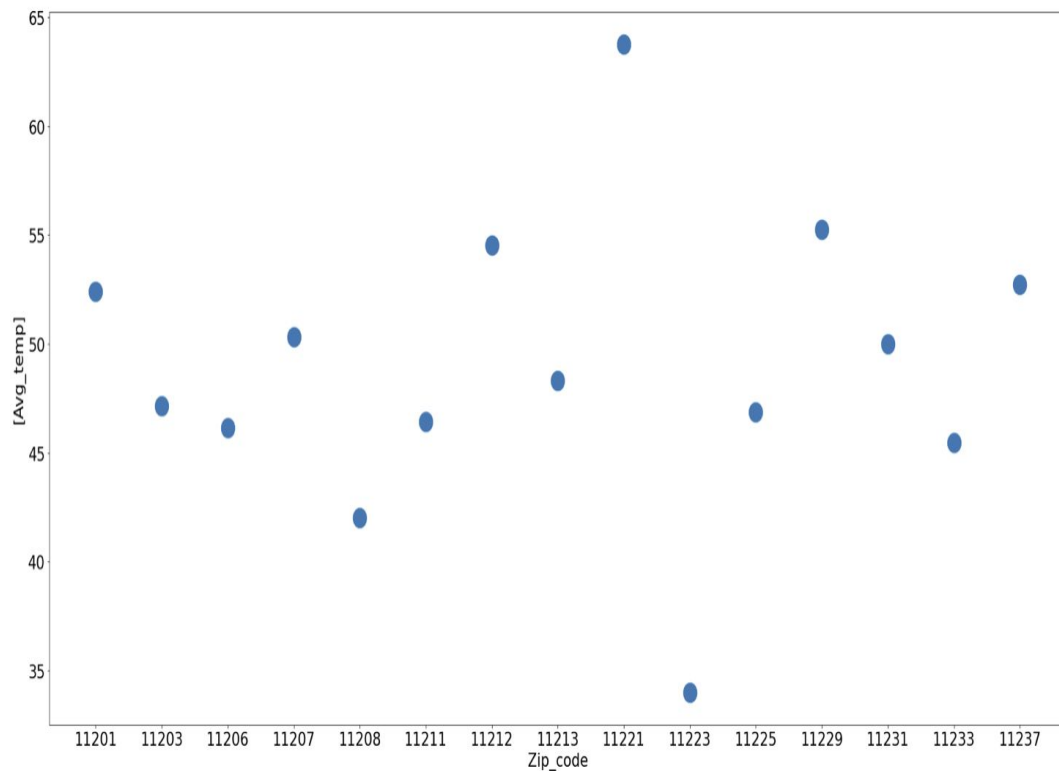# Extreme Occurrence analysis (Manhattan)
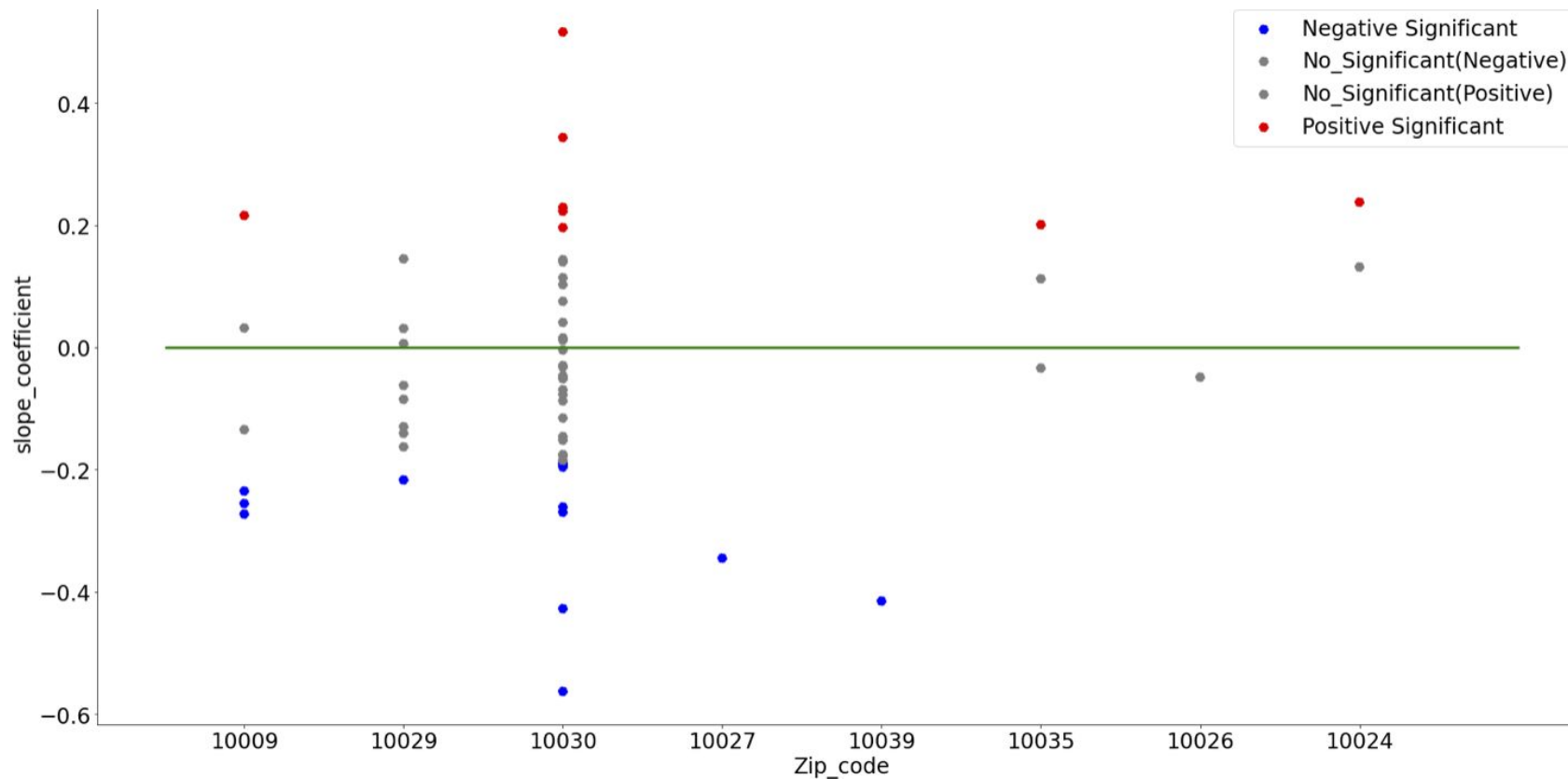
Extreme Occurrence analysis (Brooklyn)
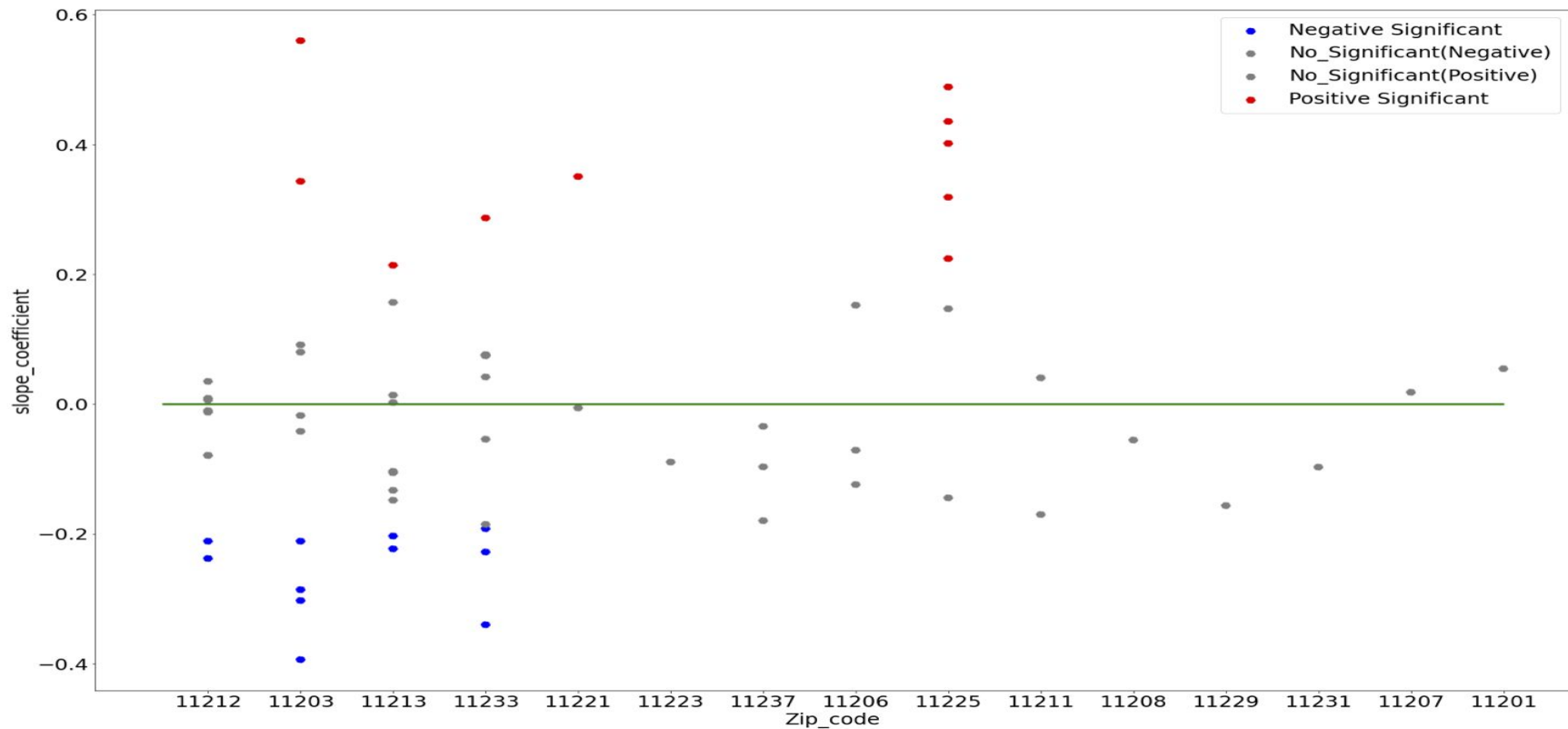
Average Temp Analysis(Manhattan)
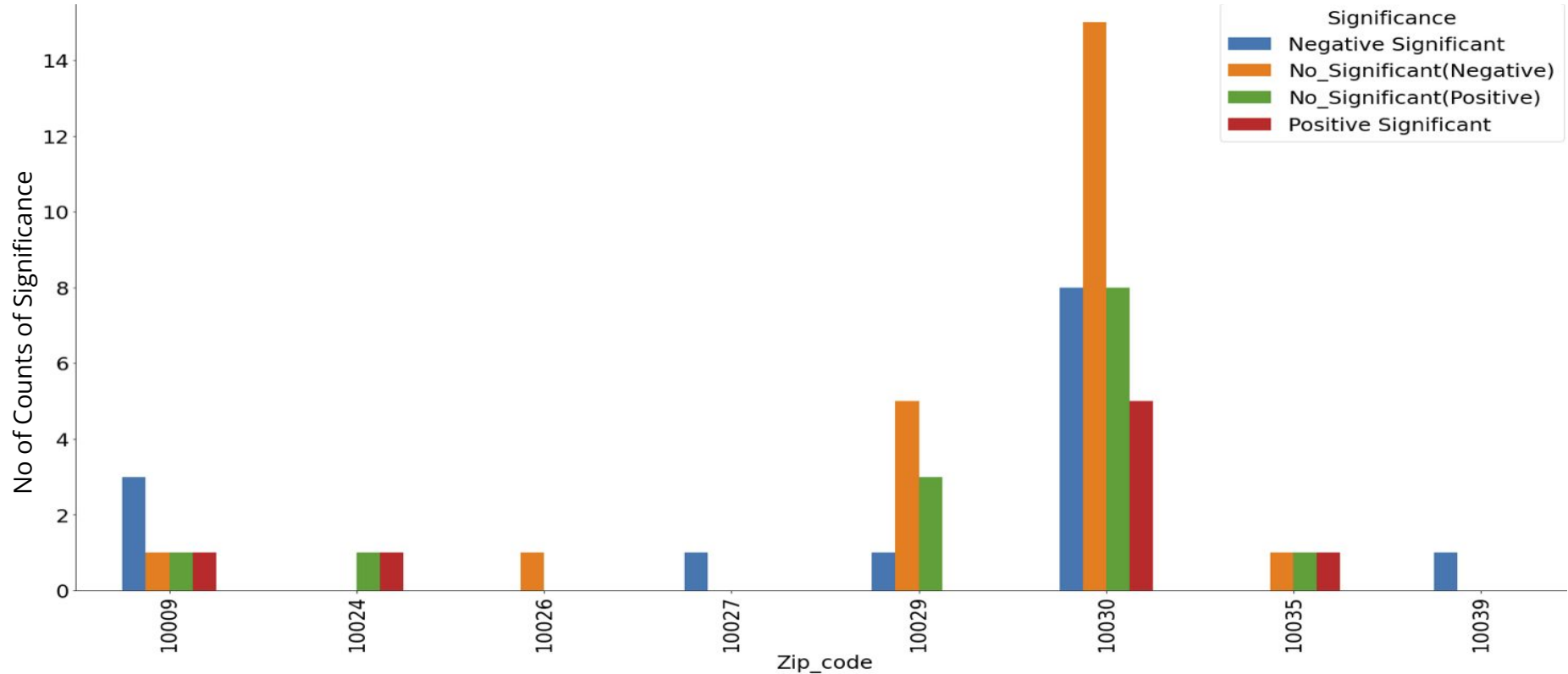
Average Temp Analysis(Brooklyn)
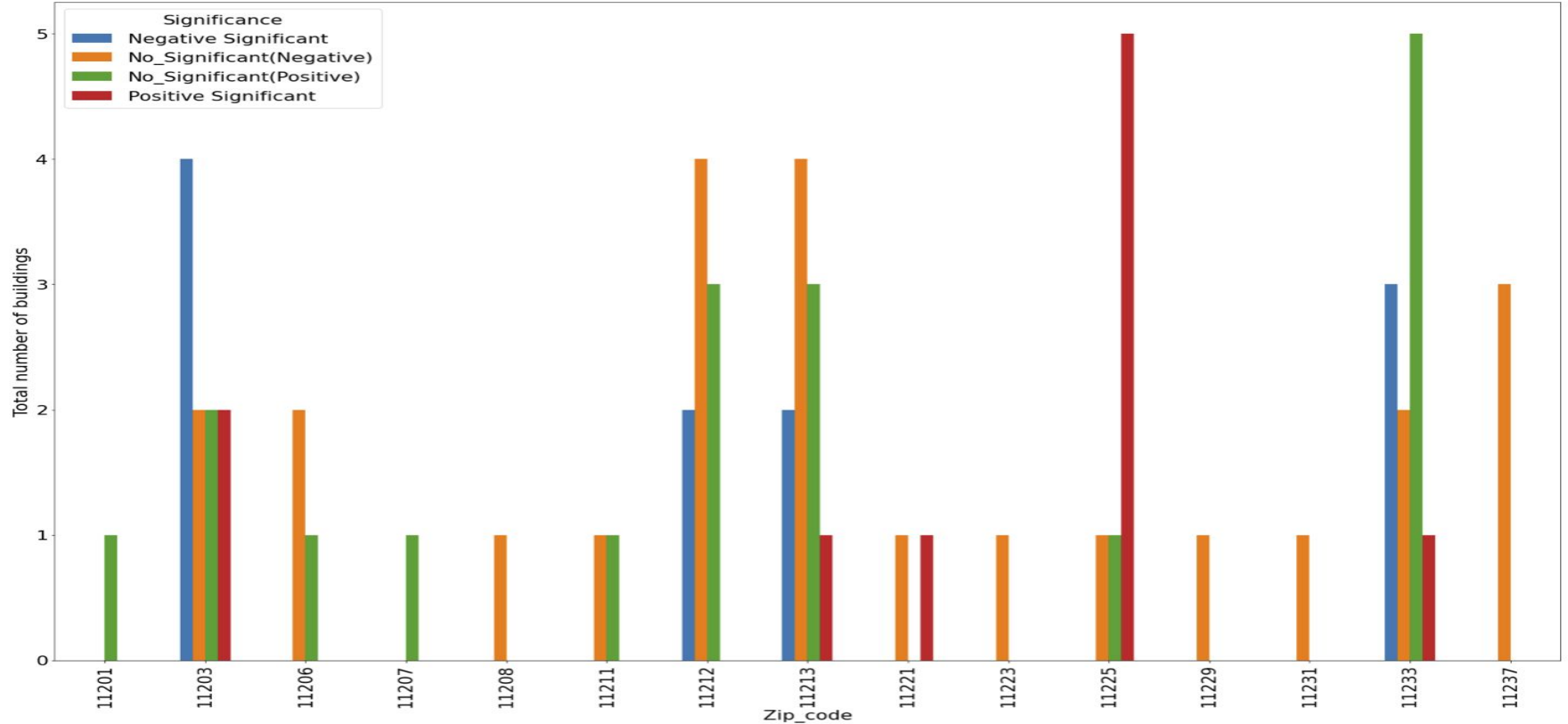
Trend Analysis (Manhattan)

Trend Analysis (Brooklyn)

Trend Analysis (Manhattan)

Trend Analysis (Brooklyn)

Conclusion

- Extreme consumption in Manhattan and Brooklyn is during cold weather.

- The ratio of consumption of water is increasing periodically.

- Zip code 10030 is consuming excess water in Manhattan.

- Zip code 11225 is consuming excess water in Brooklyn.

- Alternative methods for heating systems.

- More awareness programs for water conservation

Future Works

- Completing for each boroughs

- Boroughs Comparison

- Possible Solutions for

  Controlling high consumption

Thank You For Listening