

# Fire Emergencies in Seattle

Correlations with Rain Patterns and Human Activity

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# 1 Problem

Can we establish trends in 911 fire calls in Seattle to predict and find patterns, or correlate them with factors such as rain patterns?

## 2 Client(s)

Governmental agencies might be interested in this study to refine strategies that pinpoint influential factors in the manifestation of fires in Seattle. Insurance agencies might also find this relevant. Ultimately, the objective is to reduce the significant human and financial cost generally associated with fires. Reducing the number of fires will ultimately allow the police, fire department and other dependencies to divert their resources in other issues faced by the city and its inhabitants.

## 3 Sources and Data Sets

### Seattle Observed Monthly Rain Gauge Accumulations [1]

These monthly data goes from October 2002 to May 2017, containing measurements of 17 rain gauges located throughout Seattle city limits. There is no information on the units describing the amounts of rain. The locations of the rain gauges are given indirectly in a image (see Figure 1).

### Seattle Fire 911 Calls [2]

Fire 911 calls in Seattle, from 2010 to 2011. It contains latitude and longitude of the location of the caller, in addition to date, time and type of call. This version corresponds to the September 2, 2018 update.

Both sets of data are freely available for download, modification and distribution, under the license [CC0 1.0](#).

## 4 Data Wrangling and Exploratory Data Analysis

### 4.1 Rain Data Set

With the help of Figure 1, we can deduce an approximate location for the rain gauges (latitude and longitude) which we store in a dictionary. As we mentioned, only 17 rain gauges actually appear in the data set.

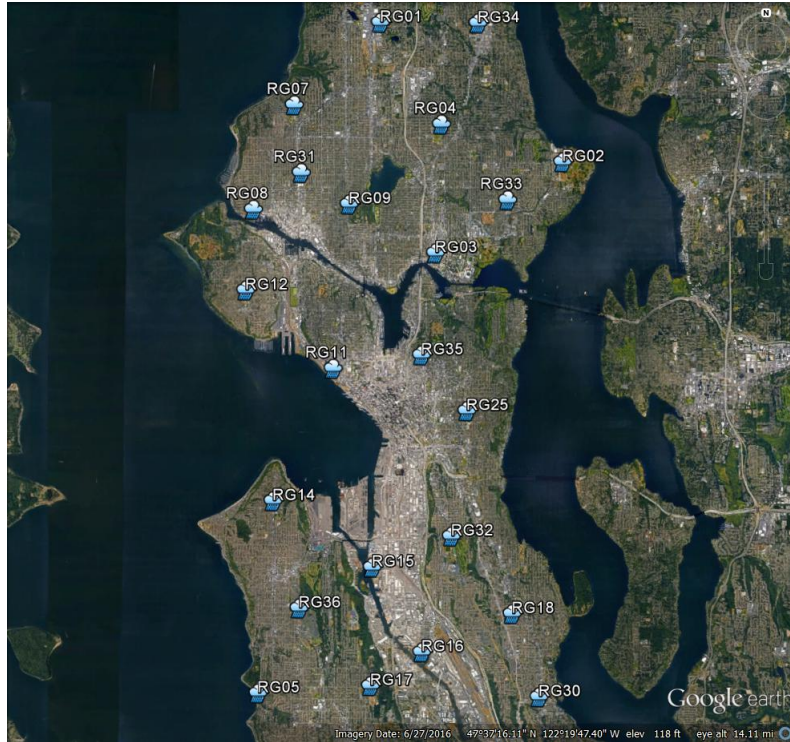


Figure 1: Locations of rain gauges in Seattle. In reality, measurements for only 17 of these gauges are reported. This image is part of the data set in [1].

We proceed to import the `csv` file and read it as a data frame. The data has a date column, and a column for each 17 rain gauges. The date column shows that measurements were taken monthly, while the other columns indicate values for rain accumulation (in unknown units). These cover the period from November, 2002 to May, 2017.

We first proceed to search for null values or outliers. There are no null or non-existent values in the data set and a direct plotting of all the data shows it to be fairly reasonable between the expectations of seasonal behavior. We can see this, for instance, in the case of the gauge RG01, as shown in Figure 2.

## 5 Initial Findings

## 6 Other Potentially Useful Data Sets

## 7 Bibliography

- [1] N. Daniels, "Seattle observed monthly rain gauge accumulations," July, 2018.  
<https://www.kaggle.com/city-of-seattle/>

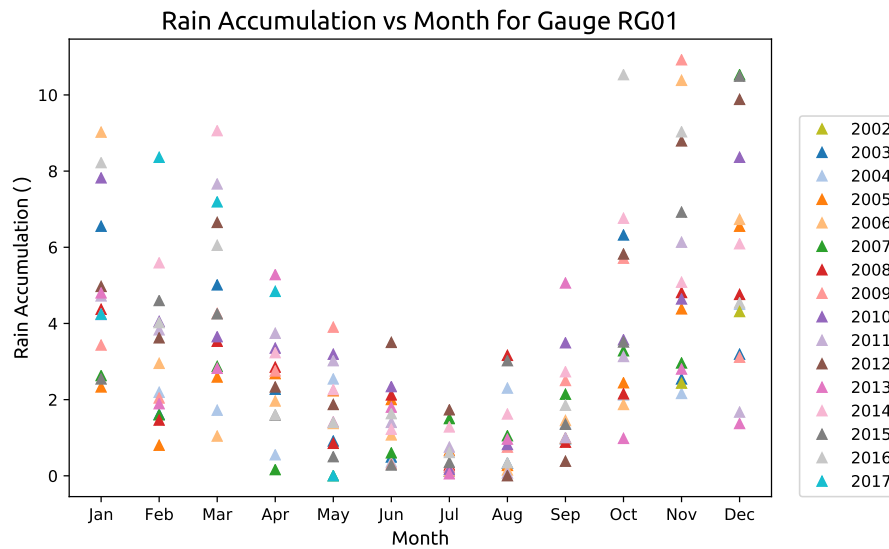


Figure 2: Rain accumulations measured by the gauge RG01 for all years.

[seattle-observed-monthly-rain-gauge-accumulations/version/16](#). Version 16. Retrieved August 20, 2018.

- [2] C. of Seattle Fire Department Management Information Systems, "Seattle fire 911 calls from 3/1/2010 to 3/1/2011," Sept., 2018.  
<https://data.seattle.gov/Public-Safety/Seattle-Fire-911-Calls-from-3-1-2010-to-3-1-2011/d9j6-s59d>. Version: September 2, 2018 update. Retrieved September 2, 2018.