# Earthquake Data Analysis with Respect to Geolocation

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## Synopsis

This analysis holds a simple purpose, fast, accurate subsetting and plotting of earthquake data that was recorded between May 18th 2016 and June 17th 2016.

Data obtained from http://earthquake.usgs.gov
Dataset used is the 'monthly' dataset which is updated every 15 minutes

For this quick analysis, there will be two world-map plots:
1. Of earthquakes with magnitude above 4.5 and of all earth quakes
2. Of all earthquakes

## Data Loading and Processing

```
# Load and Explore Dataset
url <- "http://earthquake.usgs.gov/earthquakes/feed/v1.0/summary/all_month.csv"
f <- file.path(getwd(), "storm_dataset.csv.bz2")
download.file(url, f)
eq <- read.csv("all_month.csv", header = TRUE, sep = ",")

# Load required libraries
library(plyr)
library(dplyr)
library(ggplot2)
library(ggmap)
library(RColorBrewer)

head(eq)
str(eq)
dim(eq)
```

### Earthquakes with $Mag >= 4.5$ (Flagged As Dangerous)

```
# eq5
eq45 <- subset(eq, eq$mag >= 4.5)
dim(eq45)
```

```
## [1] 345  22
```

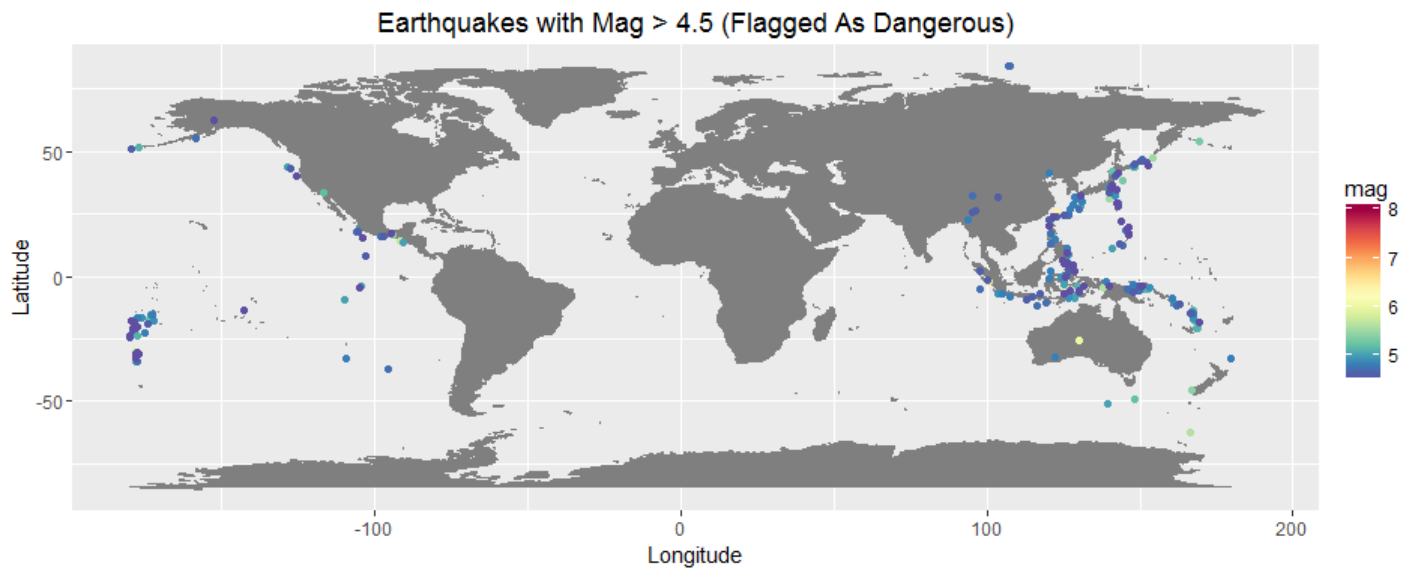
```
eq45.sorted <- arrange(eq45, desc(mag))
eq45.mod <- select(eq45.sorted, latitude, longitude, mag)
inside <- filter(eq45.mod, between(longitude, -90, 90), between(latitude, -180, 180))
eq45.mod <- setdiff(eq45.mod, inside)
```

## Earthquakes with $Mag > 0$ (All recorded seismic events)

```
# eq0
eq0 <- subset(eq, eq$mag > 0)
dim(eq0)

## [1] 9280   22

eq0.sorted <- arrange(eq0, desc(mag))
eq0.mod <- select(eq0.sorted, latitude, longitude, mag)
inside <- filter(eq0.mod, between(longitude, -90, 90), between(latitude, -180, 180))
eq0.mod <- setdiff(eq0.mod, inside)
```

## Results

```
wmap <- borders("world", colour = "gray50", fill = "gray50")

# Earthquakes with $Mag >= 4.5$ (Flagged As Dangerous)
eq45_map <- ggplot() + wmap
eq45_map <- eq45_map + geom_point(data = eq45.mod, aes(x = as.numeric(longitude),
    y = as.numeric(latitude), colour = mag)) + ggtitle("Earthquakes with Mag > 4.5
(Flagged As Dangerous)") +
    xlab("Longitude") + ylab("Latitude")
myPalette <- colorRampPalette(rev(brewer.pal(11, "Spectral")))
sc1 <- scale_colour_gradientn(colours = myPalette(100), limits = c(4.5, 8))
eq45_map + sc1
```



```r
# Earthquakes with Mag > 0 (All recorded seismic events)
eq0_map <- ggplot() + wmap
eq0_map <- eq0_map + geom_point(data = eq0.mod, aes(x = as.numeric(longitude), y =
as.numeric(latitude),
    colour = mag)) + ggtitle("Earthquakes with Mag > 0 (All recorded seismic events)") +
    xlab("Longitude") + ylab("Latitude")
myPalette <- colorRampPalette(rev(brewer.pal(11, "Spectral")))
sc2 <- scale_colour_gradientn(colours = myPalette(100), limits = c(0, 8))
eq0_map + sc2
```