QuakesAndWells

Intro

```
##This dataset examines fracking locations across Oklahoma, Kansas, Texas, Arkansa, New
##Mexico, Missouri and Colorado, as well as earthquakes in those same states.
```

Data Manipulation

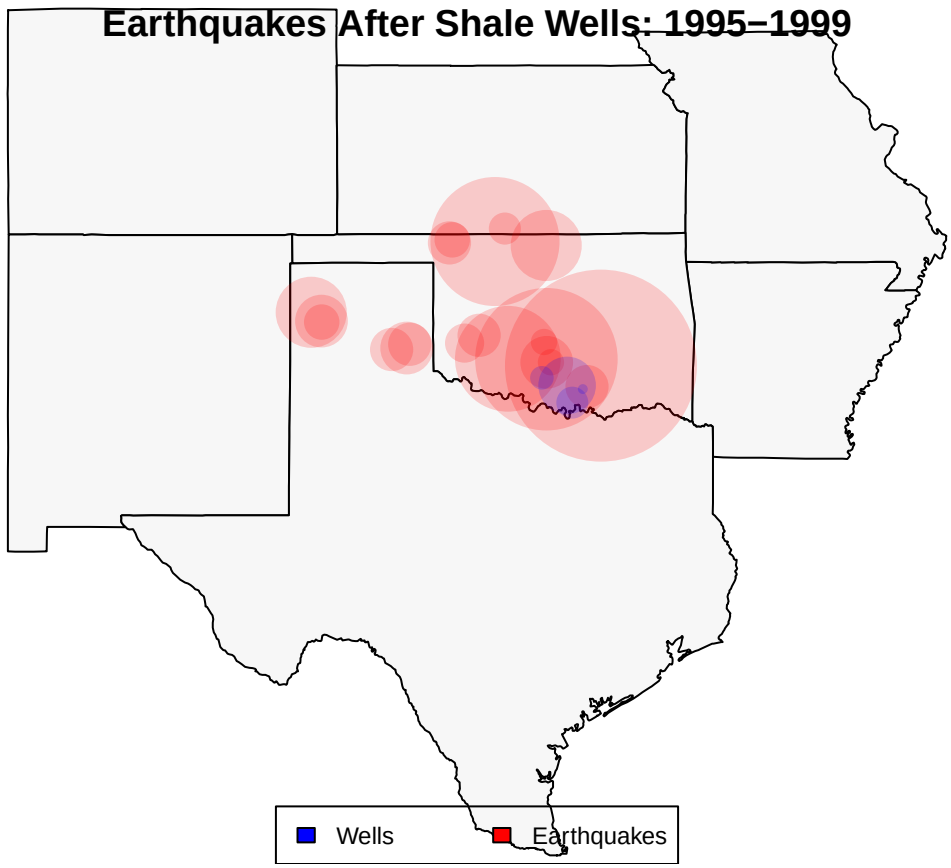
```
quakes <- read.csv("Quakes.csv")
wells <- read.csv("Wells.csv")
quakes1 <- subset(quakes, year==1995|year==1996|year==1997|year==1998|year==1999)
quakes2 <- subset(quakes, year==2000|year==2001|year==2002|year==2003|year==2004)
quakes3 <- subset(quakes, year==2005|year==2006|year==2007|year==2008|year==2009)
quakes4 <- subset(quakes, year==2010|year==2011|year==2012|year==2013|year==2014|year==2015)
wells1 <- subset(wells, Year==1995|Year==1996|Year==1997|Year==1998|Year==1999)
wells2 <- subset(wells, Year==2000|Year==2001|Year==2002|Year==2003|Year==2004)
wells3 <- subset(wells, Year==2005|Year==2006|Year==2007|Year==2008|Year==2009)
wells4 <- subset(wells, Year==2010|Year==2011|Year==2012|Year==2013|Year==2014|Year==2015)

##Subsetting data into 5-6 year chunks for modeling purposes.
```

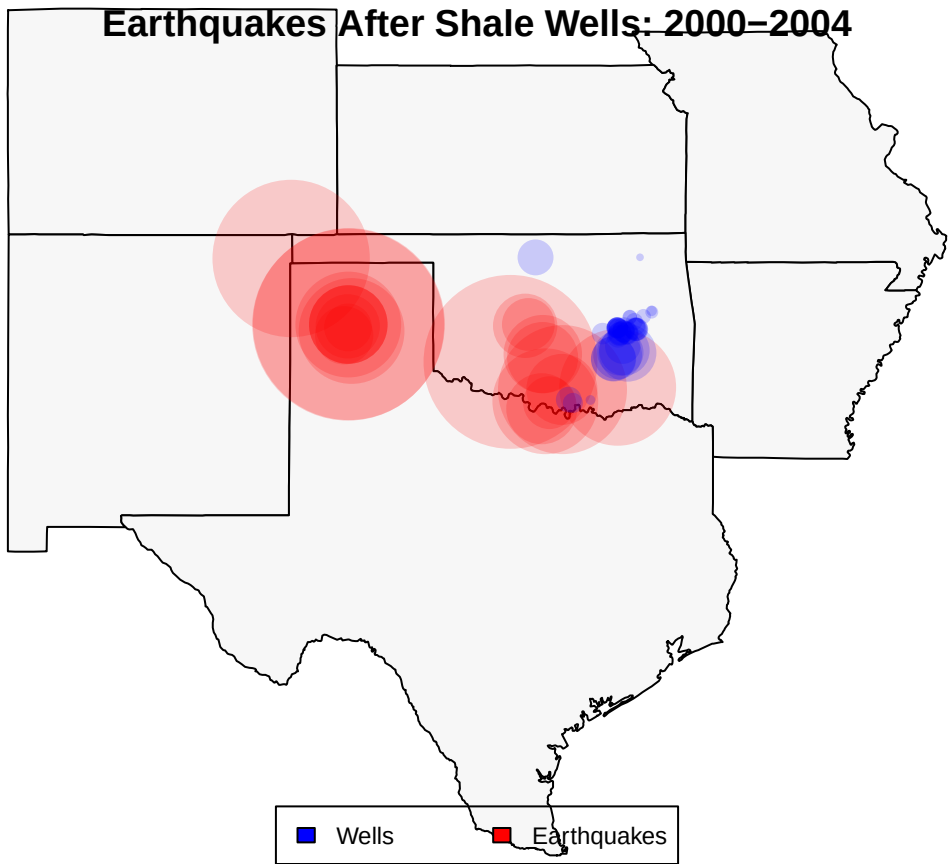
Visualization

Multiple States

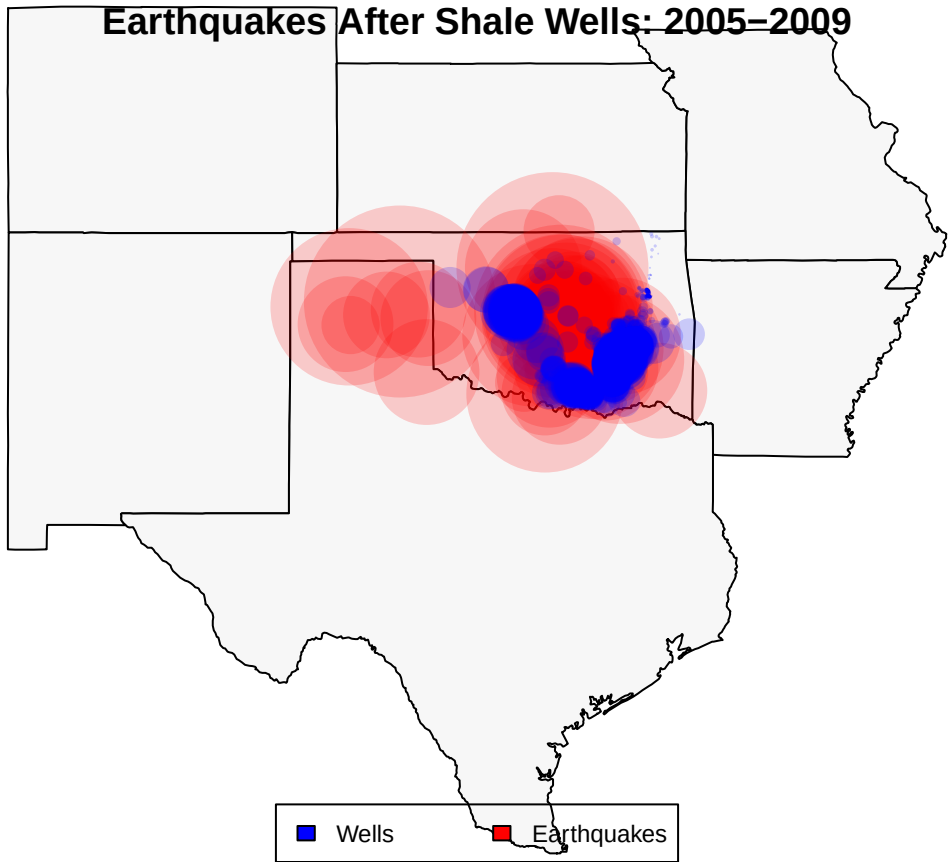
```
map("state", c("Oklahoma","Kansas","Texas","Arkansas","New Mexico","Missouri",
               "Colorado"), mar = c(0,0,0,0), fill = TRUE, col = "gray97")
title("\nEarthquakes After Shale Wells: 1995-1999")
legend("bottom", legend = c("Wells","Earthquakes"), fill =
         c("#0000FF","#FF0000"), ncol = 2,cex = .75)
symbols(quakes1$longitude, quakes1$latitude, fg=NA, bg="#FF000030", circles =
          2.7^(quakes1$mag), inches= 0.5, add=TRUE)
symbols(wells1$Longitude, wells1$Latitude, fg=NA, bg="#0000FF30", circles =
          wells1$Depth, inches = 0.15, add=TRUE)
```



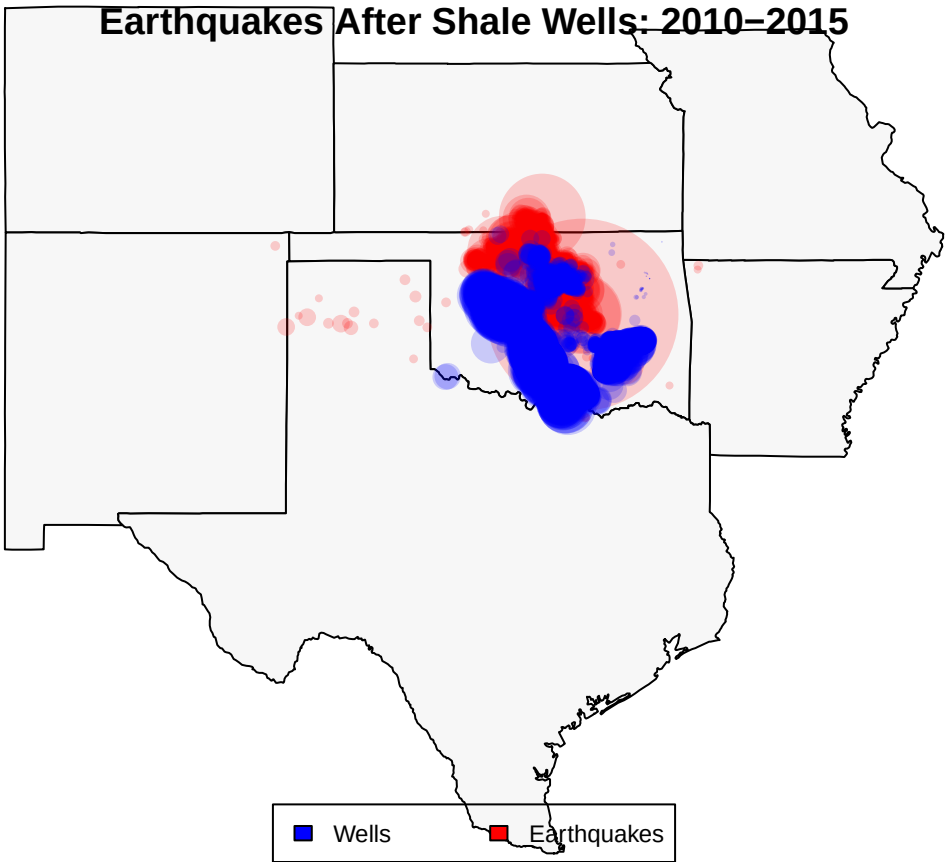

```
map("state", c("Oklahoma","Kansas","Texas","Arkansas","New Mexico",
               "Missouri","Colorado"), mar = c(0,0,0,0), fill = TRUE, col = "gray97")
title("\nEarthquakes After Shale Wells: 2000-2004")
legend("bottom", legend = c("Wells","Earthquakes"), fill =
         c("#0000FF","#FF0000"), ncol = 2,cex = .75)
symbols(quakes2$longitude, quakes2$latitude, fg=NA, bg="#FF000030", circles =
          2.7^(quakes2$mag), inches= 0.5, add=TRUE)
symbols(wells2$Longitude, wells2$Latitude, fg=NA, bg="#0000FF30", circles =
          wells2$Depth, inches = 0.15, add=TRUE)
```




```
map("state", c("Oklahoma","Kansas","Texas","Arkansas","New Mexico",
               "Missouri","Colorado"), mar = c(0,0,0,0), fill = TRUE, col = "gray97")
title("\nEarthquakes After Shale Wells: 2005-2009")
legend("bottom", legend = c("Wells","Earthquakes"), fill =
         c("#0000FF","#FF0000"), ncol = 2,cex = .75)
symbols(quakes3$longitude, quakes3$latitude, fg=NA, bg="#FF000030", circles =
          2.7^(quakes3$mag), inches= 0.5, add=TRUE)
symbols(wells3$Longitude, wells3$Latitude, fg=NA, bg="#0000FF30", circles =
          wells3$Depth, inches = 0.15, add=TRUE)
```



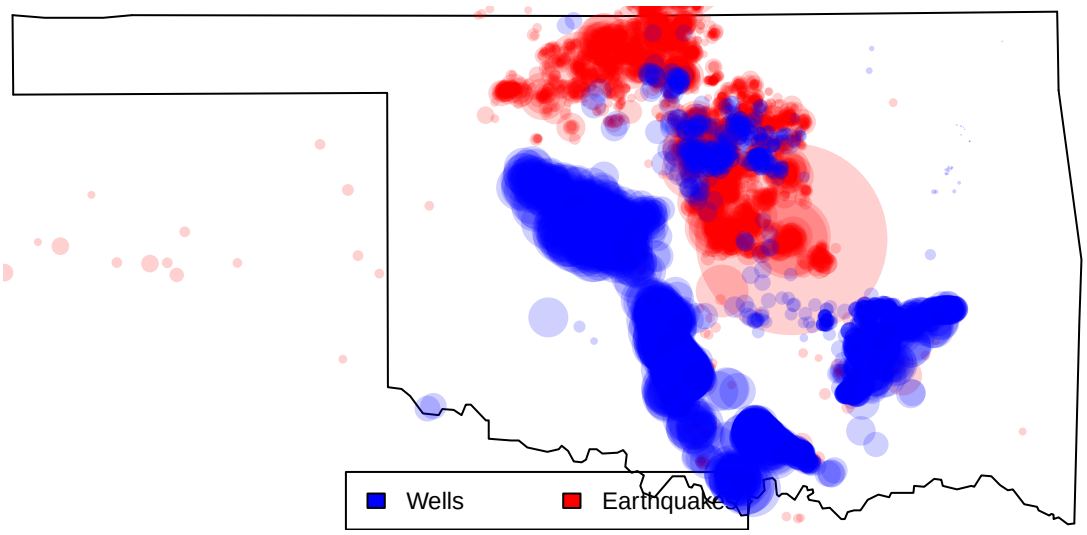

```
map("state", c("Oklahoma","Kansas","Texas","Arkansas","New Mexico",
              "Missouri","Colorado"), mar = c(0,0,0,0), fill = TRUE, col = "gray97")
title("\nEarthquakes After Shale Wells: 2010-2015")
legend("bottom", legend = c("Wells","Earthquakes"), fill =
        c("#0000FF","#FF0000"), ncol = 2,cex = .75)
symbols(quakes4$longitude, quakes4$latitude, fg=NA, bg="#FF000030", circles =
         2.7^(quakes4$mag), inches= 0.5, add=TRUE)
symbols(wells4$Longitude, wells4$Latitude, fg=NA, bg="#0000FF30", circles =
         wells4$Depth, inches = 0.15, add=TRUE)
```




```
##4 maps are created here, each one linked to a specific year set. The red circles indicate
##earthquakes, with the size of the circle corresponding roughly to the area of the quake and
##the darkness of the red indicating the magnitude. The darker the red the higher the magnitude
##of the quake. The same rules apply for wells with the color blue.
```

OK Only

```
map("state", "Oklahoma")
title("Earthquakes After Shale Wells in OK: 2010-2015")
legend("bottom", legend = c("Wells","Earthquakes"), fill =
         c("#0000FF","#FF0000"), ncol = 2,cex = .75)
symbols(quakes4$longitude, quakes4$latitude, fg=NA, bg="#FF000030", circles =
          2.7^(quakes4$mag), inches= 0.5, add=TRUE)
symbols(wells4$Longitude, wells4$Latitude, fg=NA, bg="#0000FF30", circles =
          wells4$Depth, inches = 0.15, add=TRUE)
```



Other Figures

```
## [1] "Number of Wells Dug 1995 - 1999:"
## [1] 4
## [1] "Number of Earthquakes 1995 - 1999:"
## [1] 20
## [1] "Average Quake Magnitude:"
## [1] 3.225
## [1] "Highest Quake Reported"
## [1] 4.5
## [1] "Number of Wells Dug 2000 - 2004:"
## [1] 47
## [1] "Number of Earthquakes 2000 - 2004:"
## [1] 22
## [1] "Average Quake Magnitude:"
## [1] 3.127273
## [1] "Highest Quake Reported"
## [1] 3.9
```

```
## [1] "Number of Wells Dug 2005 - 2009:"
## [1] 1423
## [1] "Number of Earthquakes 2005 - 2009:"
## [1] 67
## [1] "Average Quake Magnitude:"
## [1] 2.953731
## [1] "Highest Quake Reported"
## [1] 3.7
## [1] "Number of Wells Dug 2010 - 2015:"
## [1] 2883
## [1] "Number of Earthquakes 2010 - 2015:"
## [1] 5645
## [1] "Average Quake Magnitude:"
## [1] 2.858078
## [1] "Highest Quake Reported"
## [1] 5.7
```