hack the globe

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```
# load necessary libraries
library(MPV)
```

```
## Loading required package: lattice
```

```
## Loading required package: KernSmooth
```

```
## KernSmooth 2.23 loaded
## Copyright M. P. Wand 1997-2009
```

```
library(tidyverse)
```

```
## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5     v purrr   0.3.4
## v tibble  3.1.6     v dplyr   1.0.8
## v tidyr   1.2.0     v stringr 1.4.0
## v readr   2.0.1     v forcats 0.5.1
```

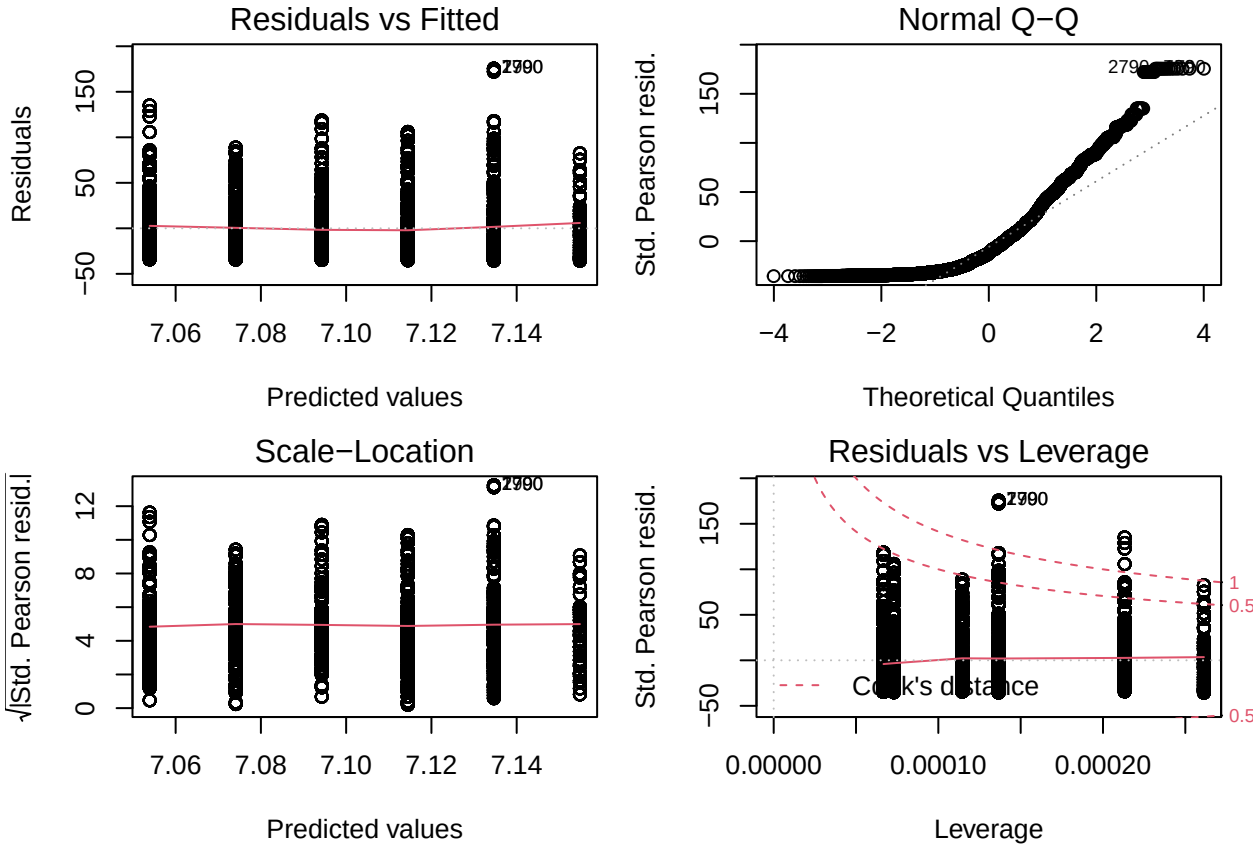
```
## -- Conflicts ------------------------------------------ tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()
```

```
# load the data
percip <- read.csv("percip_brazil.csv")

#group by year
percip <- percip |> group_by(year)

# get the response variable - value(which is the precipitation), and the predictor - year
x <- percip$year
y <- percip$value

#plot(x, y)
par(mfrow=c(1,2))
par(mfrow=c(2,2), mar=c(4, 4, 2, 1))

# Run a generalized linear model on it using poisson to predict precipitation
y.glm <- glm(y ~ x, family = poisson(link = "log"))

summary(y.glm)
```

```
##
## Call:
## glm(formula = y ~ x, family = poisson(link = "log"))
##
```

```
## Deviance Residuals:
##    Min      1Q  Median      3Q     Max
## -50.09  -35.01  -12.82   15.52  119.27
##
## Coefficients:
##               Estimate Std. Error z value Pr(>|z|)
## (Intercept) -33.513807   0.303872  -110.3   <2e-16 ***
## x             0.020183   0.000151   133.7   <2e-16 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## (Dispersion parameter for poisson family taken to be 1)
##
##     Null deviance: 18916891  on 15999  degrees of freedom
## Residual deviance: 18898993  on 15998  degrees of freedom
## AIC: 19028515
##
## Number of Fisher Scoring iterations: 5
```

```
plot(y.glm)
```



The p-value is highly significant and we have very low standard error. So, we fail to reject the null hypothesis.

The formula to predict rainfall is:

- precipitation = -33.5 + 0.02*year.