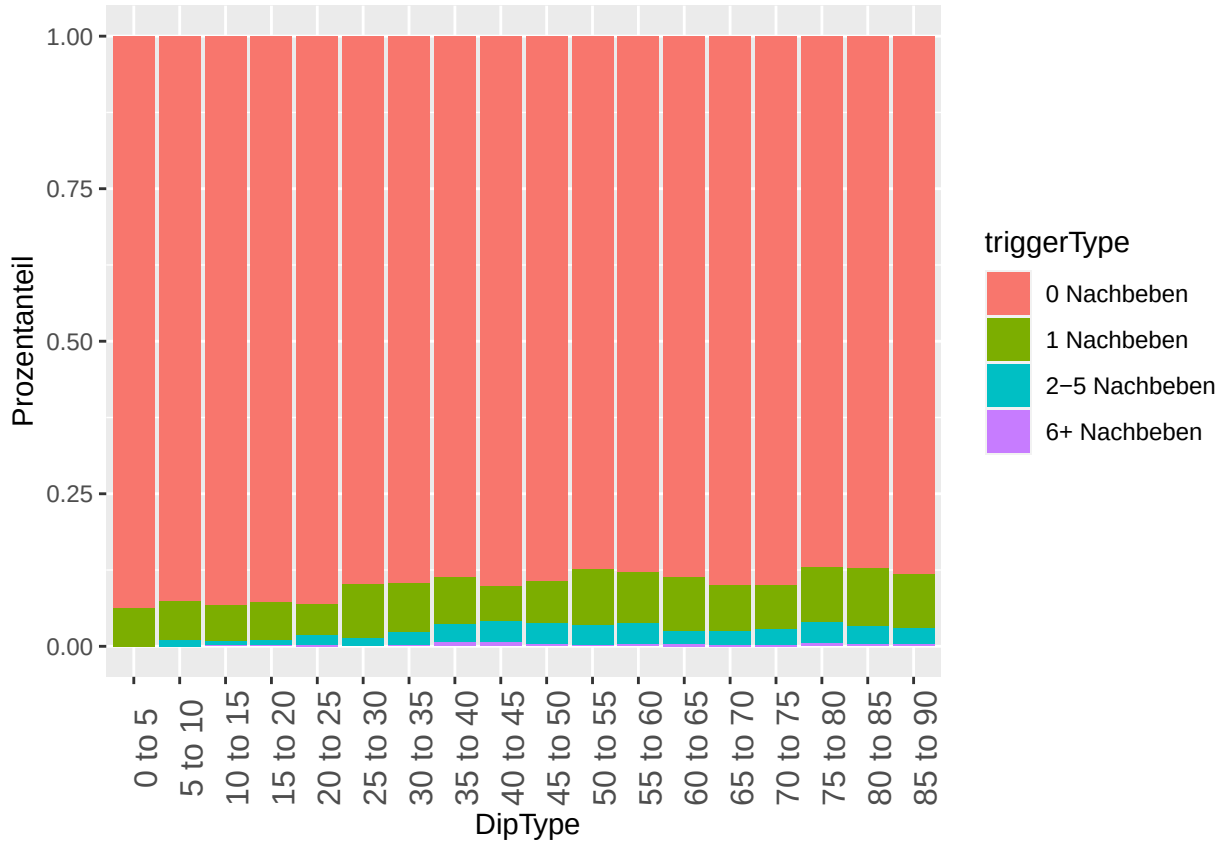
Dip und Rake

Erdbeben-Gruppe

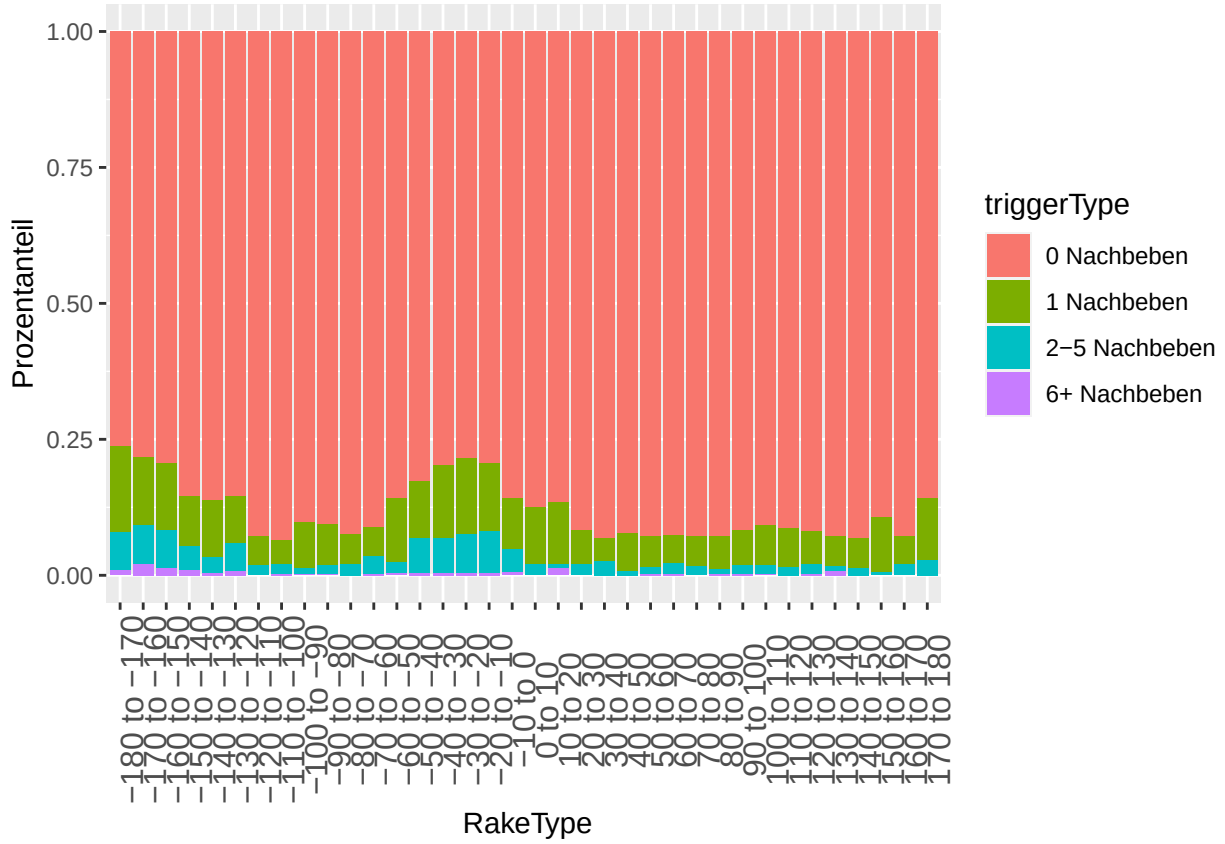
14 1 2021

Zuallererst zwei Barplots(zu 100% skaliert) zu dip und rake unterteilt in Intervalle der Winkel.

```
# Temporaere Hilfsspalte
full_data$count <- rep(1, nrow(full_data))
# Intervalle fuer dip
labels_dip <- character(18)
for (i in seq_len(length(labels_dip))) {
  labels_dip[[i]] <- paste0(seq(-0, 90, 5)[[i]], " to ", c(seq(-0, 90 , 5))[[i + 1]])
}
full_data$dipType <- cut(full_data$dip, breaks = c(-0.1, seq(5, 90, 5)),
                         labels = labels_dip)
# Barplots
ggplot(data = full_data, aes(x = dipType, y = count, fill = triggerType)) +
  geom_bar(position = "fill", stat = "identity") + xlab(" DipType") +
  ylab("Prozentanteil") + theme(axis.text.x = element_text(angle = 90, size = 12))
```

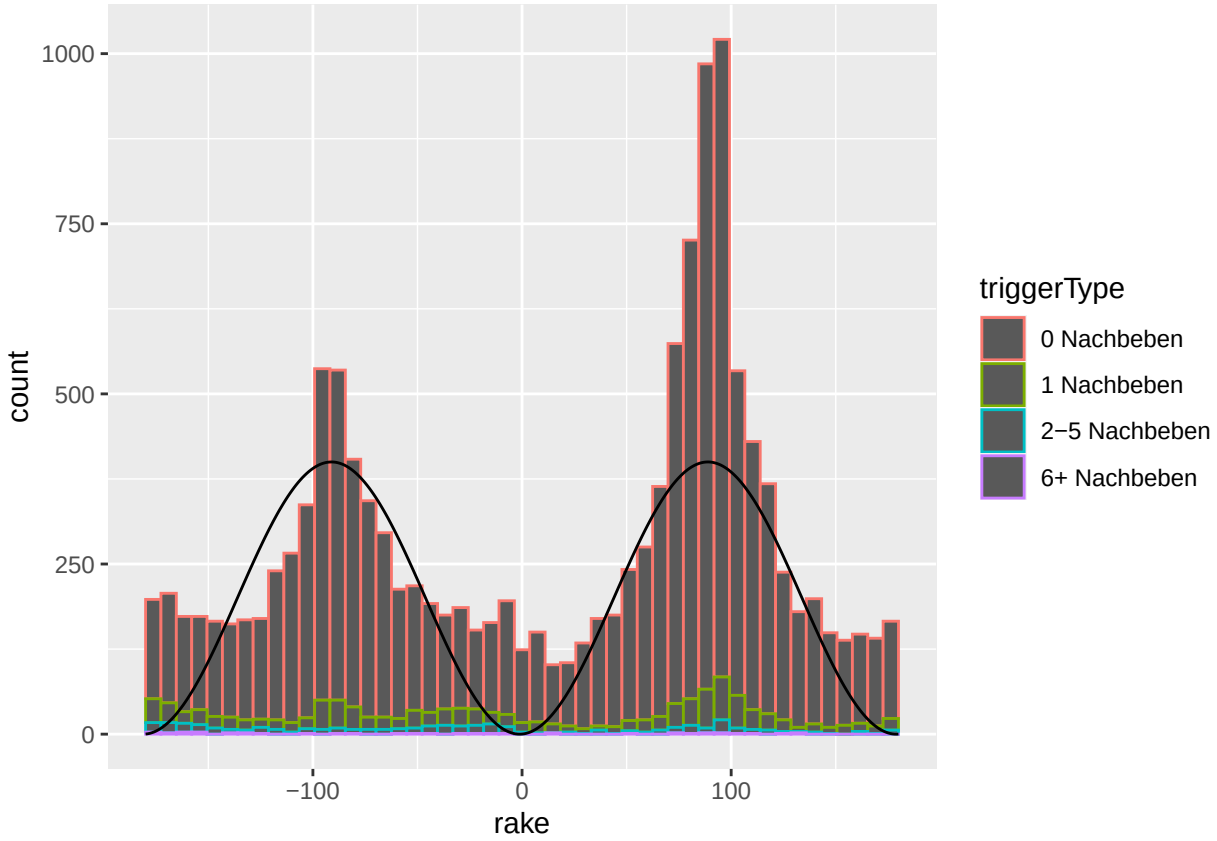


```r
# Intervalle fuer rake
labels_rake <- character(36)
for (i in seq_len(length(labels_rake))) {
  labels_rake[[i]] <- paste0(seq(-180, 180 , 10)[[i]], " to ",
                             c(seq(-180, 185 , 10))[[i + 1]])
}
full_data$rakeType <- cut(full_data$rake, breaks = c(-180.1, seq(-170, 180 , 10)),
                    labels = labels_rake)
# Barplot
ggplot(data = full_data, aes(x = rakeType, y = count, fill = triggerType)) +
  geom_bar(position = "fill", stat = "identity") + xlab(" RakeType") +
  ylab("Prozentanteil") + theme(axis.text.x = element_text(angle = 90, size = 12))
```



Bereits aus diesem Plot zu rake lässt sich schliessen, dass unsere Vermutung, dass vermehrt Triggerbeben in Bereichen von -90/90° vermutlich falsch war. Daher biteten unserere zyklische Variable und die Variable des absoluten Abstands zu -90/90° auch fast keinen Erklärungswert und sind nicht signifkant.

```r
# Grafisch versucht die Variable zyklisch ueber (-)90° laufen zu lassen
ggplot(full_data, aes(x = rake, colour = triggerType)) + geom_histogram(bins = 50) +
  geom_line(aes(y = sin(rake * 2 * pi / 180 + 110) +
                  200 * cos(rake * 2 * pi / 180 + 110) + 200),
            col = "black")
```




```
# Und dann derart in ein Modell einflassen lassen
summary(lm(triggerCountTh ~ I(sin(rake * 2 * pi / 180 + 110) +
                               200 * cos(rake * 2 * pi / 180 + 110) + 1), full_data))
```

```
##
## Call:
## lm(formula = triggerCountTh ~ I(sin(rake * 2 * pi/180 + 110) +
##     200 * cos(rake * 2 * pi/180 + 110) + 1), data = full_data)
##
## Residuals:
##    Min     1Q Median     3Q    Max
##  -0.27  -0.24  -0.21  -0.20 506.80
##
## Coefficients:
##                                                                          Estimate
## (Intercept)                                                             0.2368708
## I(sin(rake * 2 * pi/180 + 110) + 200 * cos(rake * 2 * pi/180 + 110) + 1) -0.0001887
##                                                                         Std. Error
## (Intercept)                                                              0.0438428
## I(sin(rake * 2 * pi/180 + 110) + 200 * cos(rake * 2 * pi/180 + 110) + 1)  0.0002790
##                                                                         t value
## (Intercept)                                                               5.403
## I(sin(rake * 2 * pi/180 + 110) + 200 * cos(rake * 2 * pi/180 + 110) + 1)  -0.677
##                                                                         Pr(>|t|)
## (Intercept)                                                             6.67e-08
## I(sin(rake * 2 * pi/180 + 110) + 200 * cos(rake * 2 * pi/180 + 110) + 1)    0.499
```

```
##
## (Intercept)                                                                  ***
## I(sin(rake * 2 * pi/180 + 110) + 200 * cos(rake * 2 * pi/180 + 110) + 1)
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.516 on 13707 degrees of freedom
## Multiple R-squared:  3.339e-05,  Adjusted R-squared:  -3.956e-05
## F-statistic: 0.4577 on 1 and 13707 DF,  p-value: 0.4987
```

Der p-Wert bei dieser Variable liegt nur bei 0.499 (leider hier etwas verzerrt).

```
# Absoluter Abstand zu den naeheren (-)90°
rake_abs <- full_data$rake
for (i in seq_len(length(rake_abs))) {
  if (rake_abs[[i]] < 0) {
    rake_abs[[i]] <- abs(rake_abs[[i]] + 90)
  }
  else {
    rake_abs[[i]] <- abs(rake_abs[[i]] - 90)
  }
}
full_data$rake_abs <- rake_abs
head(full_data[, c("rake", "rake_abs")])
```

```
##   rake rake_abs
## 1   89        1
## 2   96        6
## 3   55       35
## 4 -130       40
## 5 -123       33
## 6 -145       55
```

```
summary(lm(triggerCountTh ~ rake_abs, full_data))
```

```
##
## Call:
## lm(formula = triggerCountTh ~ rake_abs, data = full_data)
##
## Residuals:
##    Min     1Q Median     3Q    Max
##  -0.26  -0.23  -0.22  -0.21 506.79
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept) 0.2045788  0.0596579   3.429 0.000607 ***
## rake_abs    0.0005881  0.0014709   0.400 0.689309
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.517 on 13707 degrees of freedom
## Multiple R-squared:  1.166e-05,  Adjusted R-squared:  -6.129e-05
## F-statistic: 0.1598 on 1 and 13707 DF,  p-value: 0.6893
```

Im folgenden noch weitere Analyseergebnisse dieser beiden Winkel.