Below, the Y variables 'drought' and 'wildfire' will be models for binomial functions using the logit link (delta.temp, year, and delta.temp*year will be the x variables).

This project focused on the analysis of the weather disaster dataset, and specifically focused on modeling the occurrence of drought and wildfires.

The dataset that we used already includes variables including the year and drought and wildfire count. I used a generalized linear model (GLM) with a binomial distribution and a logit link function to model these vents. The models were based on the interactions between the year and delta.temp (difference in temperature per year) on the chances of drought and wildfire occurrence.

```
# drought model
model_drought <- glm(Drought.Count ~ delta.temp * Year, data = weather_data, family = binomial(link = "logit"))

# wildfire model
model_wildfire <- glm(Wildfire.Count ~ delta.temp * Year, data = weather_data, family = binomial(link = "logit"))
```

For drought, the model used was Drought.Count ~ delta.temp * Year. This model refers to the change in temperature over time and their influence on the occurrence of droughts. Similarly, for wildfires, the model used was Wildfire.Count ~ delta.temp * Year. This model refers to the change in temperature over time and their influence on the occurrence of wildfires.

Using Akaike score and deviance differences to look at which is best model for each of the two:

AIC (Akaike information criterion) and deviance were used to compare the two models. AIC is a measure of the quality of statistical models for a dataset; lower AIC indicates a better model. Deviance measures the fit of a model; lower deviance indicates a model that better fits the data.

```
# AIC for each model
aic_drought <- AIC(model_drought)
aic_wildfire <- AIC(model_wildfire)

# deviance for each model
deviance_drought <- deviance(model_drought)
deviance_wildfire <- deviance(model_wildfire)
```

```
Drought Model AIC: 54.52863
Drought Model Deviance: 46.52863

Wildfire Model AIC: 51.71748
```

```
Wildfire Model Deviance: 43.71748
```

```r
# find differences of AIC and deviance
aic_diff <- abs(aic_drought - aic_wildfire)
deviance_diff <- abs(deviance_drought - deviance_wildfire)
cat("AIC Difference:", aic_diff, "\n")
cat("Deviance Difference:", deviance_diff, "\n")
```

Both the AIC difference and deviance difference between the two models was 2.811153. This means that both models are similar in their fit and predictive quality.

For both models, the deviance model was the better model. When using GLMS, a lower deviance indicates a model that better fits the data, since deviance is a measure of the difference between the fitted model and the saturated model (the best possible model).