

PROJECT 3: OTHER REGRESSIONS
MASM22/FMSN30: LINEAR AND LOGISTIC REGRESSION 7.5 HP, 2023
Oral presentation: **Tuesday 23 May – Friday 26 May**
Submit the slides **before** your presentation

More models for the monthly precipitation

We will continue studying the weather data from Project 1 and 2 and try different ways to handle the skewed distribution of the monthly precipitation. You should choose **one** of the following three alternatives and give a 15 minute oral presentation of your finds.

Alternative A. Poisson and/or Negative binomial regression

The monthly amount of precipitation is not count data but if we round them to the nearest integers we get non-negative integers that can be treated as if they were:

```
weather$rain_integer <- round(weather$rain)
```

Determine whether you can use a Poisson regression or if a Negative binomial regression fits the data better and use the usual model selection and validation tools to find a suitable model and investigate its properties.

Alternative B. Ordinal and multinomial logistic regression

Divide the monthly precipitations into three, or more, groups with increasing precipitation. If you want g groups of equal width, use

```
weather$group <- cut(weather$rain, breaks = g)
```

If you instead want g groups with equal number of observations, use

```
weather$group <- cut(weather$rain,  
                     breaks = quantile(weather$rain, probs = seq(0, g)/g),  
                     include.lowest = TRUE)
```

Model the probabilities for the different categories using ordinal logistic regression. Use the usual model selection and validation tools to find a good model and investigate its properties.

Additionally, ignore the fact that the categories are ordered and model the probabilities using a multinomial logistic regression as well, and compare the results to the ones from the ordinal logistic regression.

Alternative C. Quantile regression

Model some of the quantiles as a function of the other variables. Start with only one continuous x -variable before you build a more complicated model. You might want to transform the precipitation to improve the model.