

Distributional Modelling in R

05 - Discrete Distributions - Exercises

In this example we analyze weather data obtained from German meteorological stations, provided by the Deutscher Wetterdienst (DWD, <https://www.dwd.de/>). A precompiled R data frame can be download with the following R code

```
R> download_data <- function(data = "WeatherGermany10.rds") {  
+   file <- paste0("https://nikum.org/dmr/Data/", data)  
+   tdir <- tempfile()  
+   dir.create(tdir)  
+   download.file(file, file.path(tdir, data))  
+   return(readRDS(file.path(tdir, data)))  
+ }  
R> WeatherGermany10 <- download_data("WeatherGermany10.rds")
```

1. According to the Beaufort scale, severe storms occur from a wind speed of 24.5-28.4 m/s. For each station in the data set, count the number of severe storms per year.
2. Visualize the distribution of severe storm counts using a barplot and estimate count data distribution models. What are the top three fitting distributions? Add estimated probabilities to the barplot.
3. Estimate a spatial climatology model for severe storm counts including altitude information. Interpret the results. Show the risk map of more than 2 severe storms.