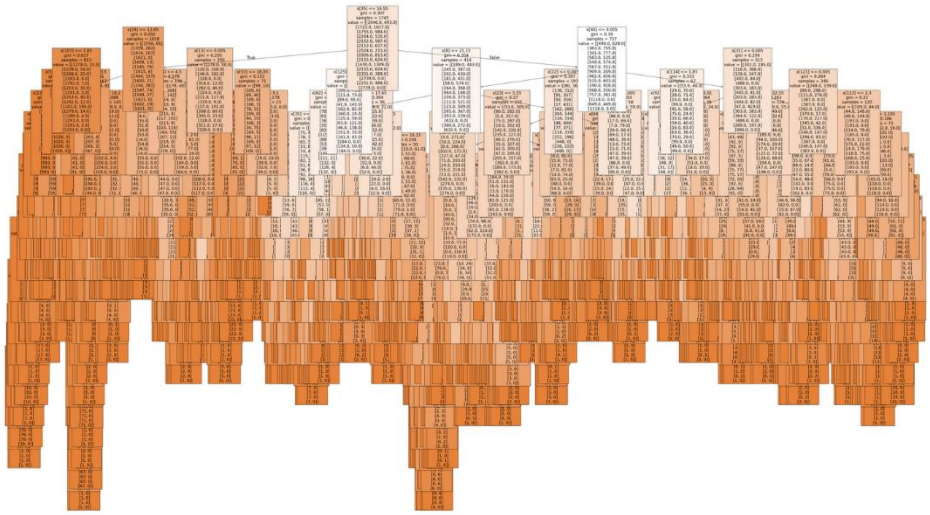
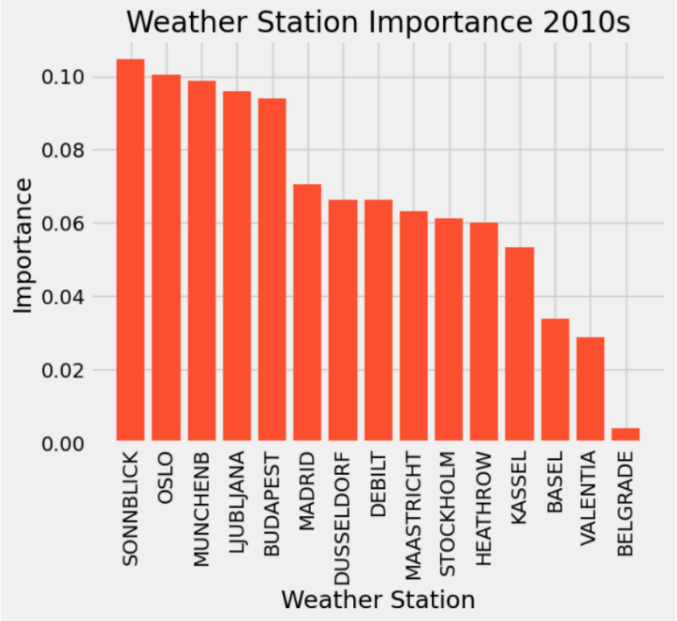
Random Forest Model

The data was reduced to a single decade: the 2010s. With n_estimators = 100 and automatic max_depth, the accuracy comes out at 57.6 %. Please note that I didn't apply the np.argmax() method but kept all 15 columns in the y array instead. This resulted in a more complex decision tree.

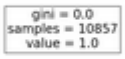


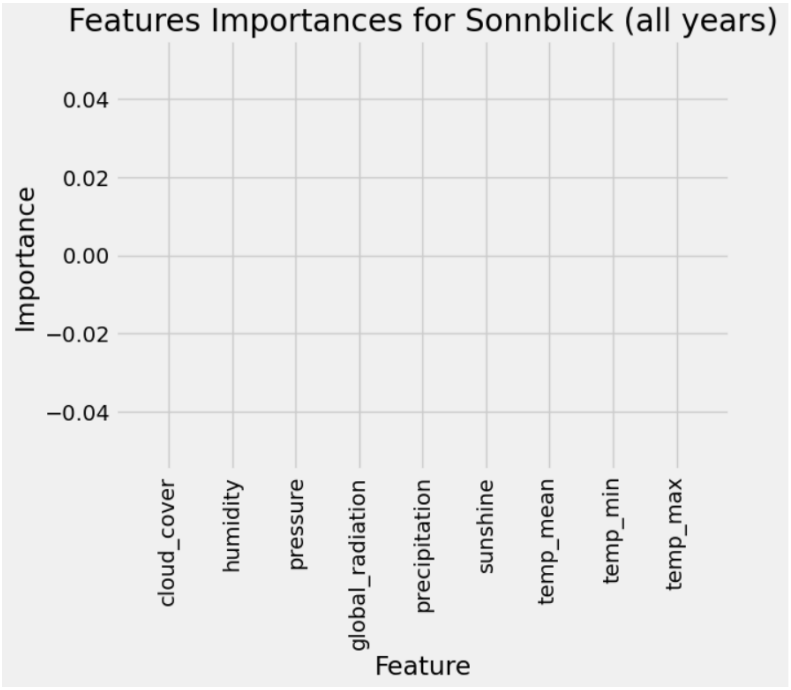


The 3 most important features resulted in: Sonnblick, Oslo, and Munchenb

For each of these 3 stations, another random forest model was created, this time using data from every year in the observations set

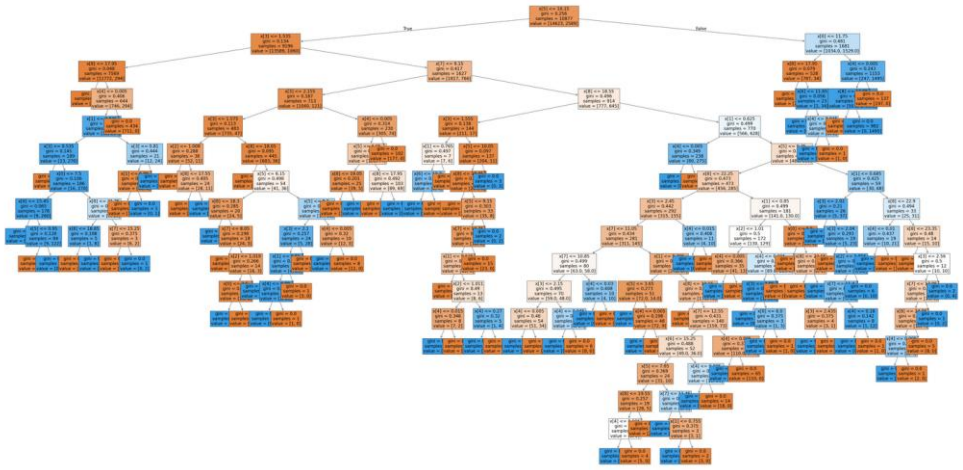
1. Sonnblick Results

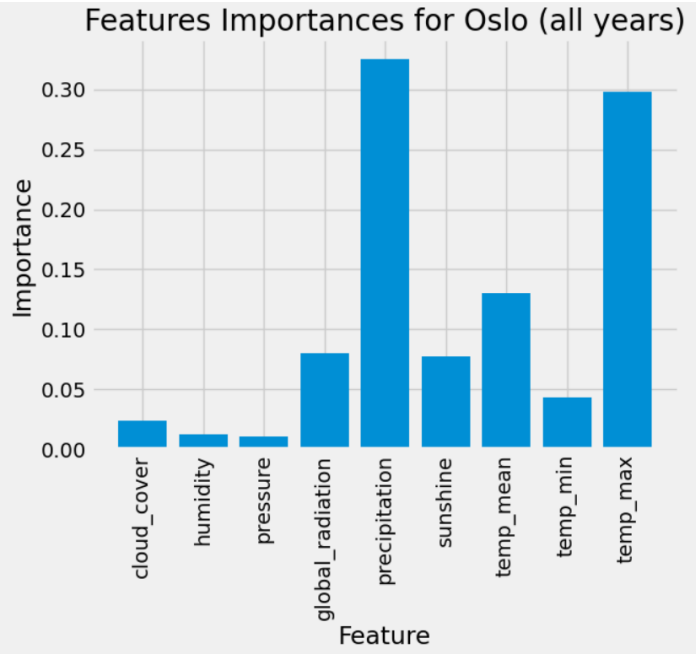




With n_estimators = 100 and automatic max_depth, the accuracy comes out at 100%. However, this city is s special case where all days are classified a “unpleasant” making the decision tree model useless and where no indicators affect the classification.

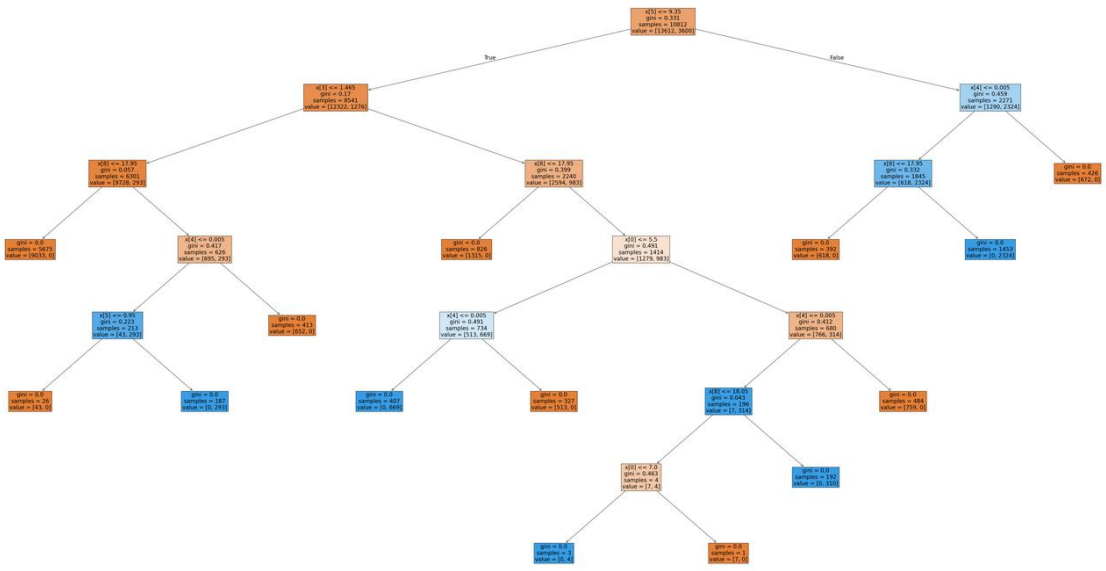
2. Oslo Results

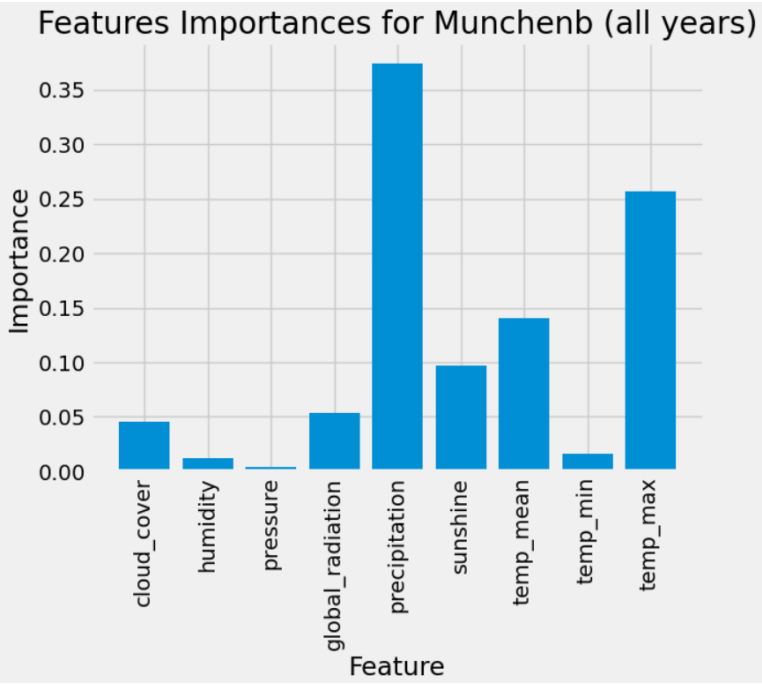




With n_estimators = 100 and automatic max_depth, the accuracy comes out at 99%. The 3 most important indicators are (in descending order): precipitation, temp_max, and temp_mean.

3. Munchenb Results





With n_estimators = 100 and automatic max_depth, the accuracy comes out at 100%. The 3 most important indicators are (in descending order): precipitation, temp_max, and temp_mean

Conclusions

The consistent importance of precipitation and temp_max across the examined weather stations suggests that these indicators will play a key role in predicting and adapting to future climate variability. In addition, considering the rising trend in mean temperatures over time, which aligns with global climate change, it becomes even more critical to focus on temperature-related indicators such as temp_max and temp_mean alongside precipitation.

As the global climate gets warmer, higher maximum and mean temperatures are likely to become more frequent and extreme, influencing not only heat waves but also other weather phenomena like droughts, storms, and even shifts in precipitation patterns. In fact, rising temperatures could intensify precipitation events in some regions while reducing rainfall in others, making precipitation tracking essential for understanding local impacts. Thus, investing in climate-tracking equipment for temperature and precipitation monitoring becomes paramount to ensuring preparedness for the evolving nature of weather patterns.