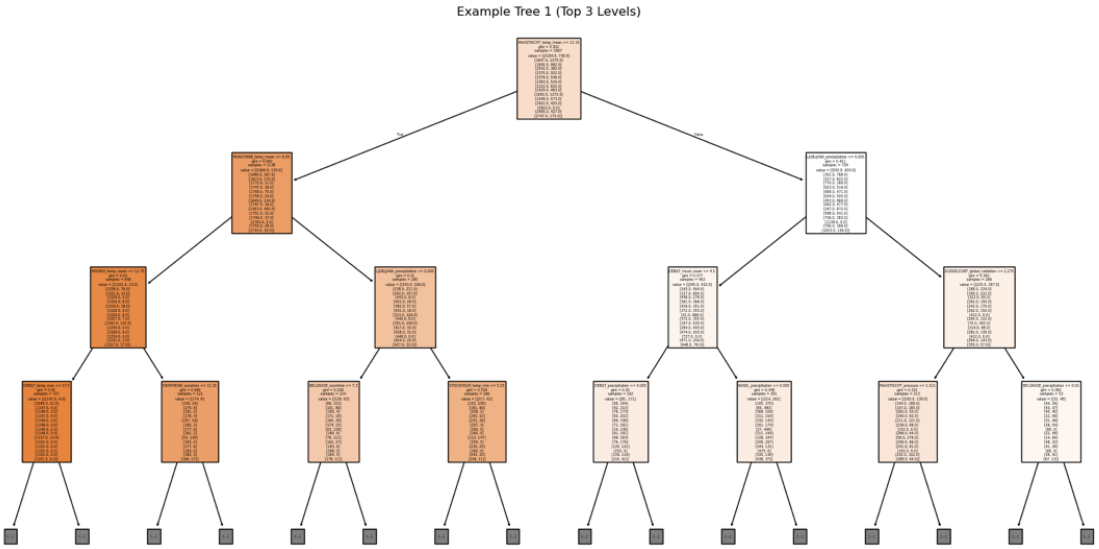
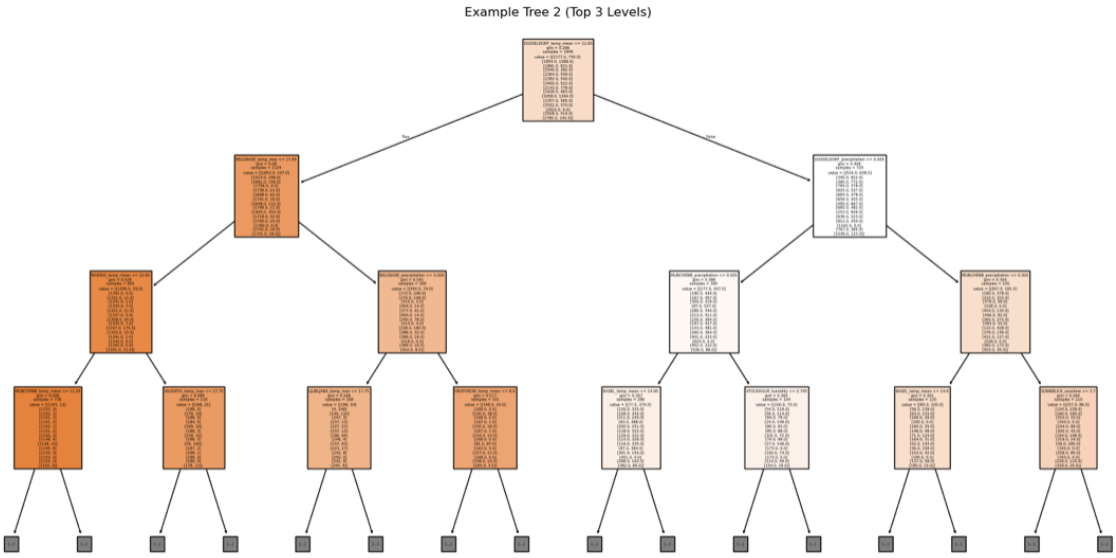
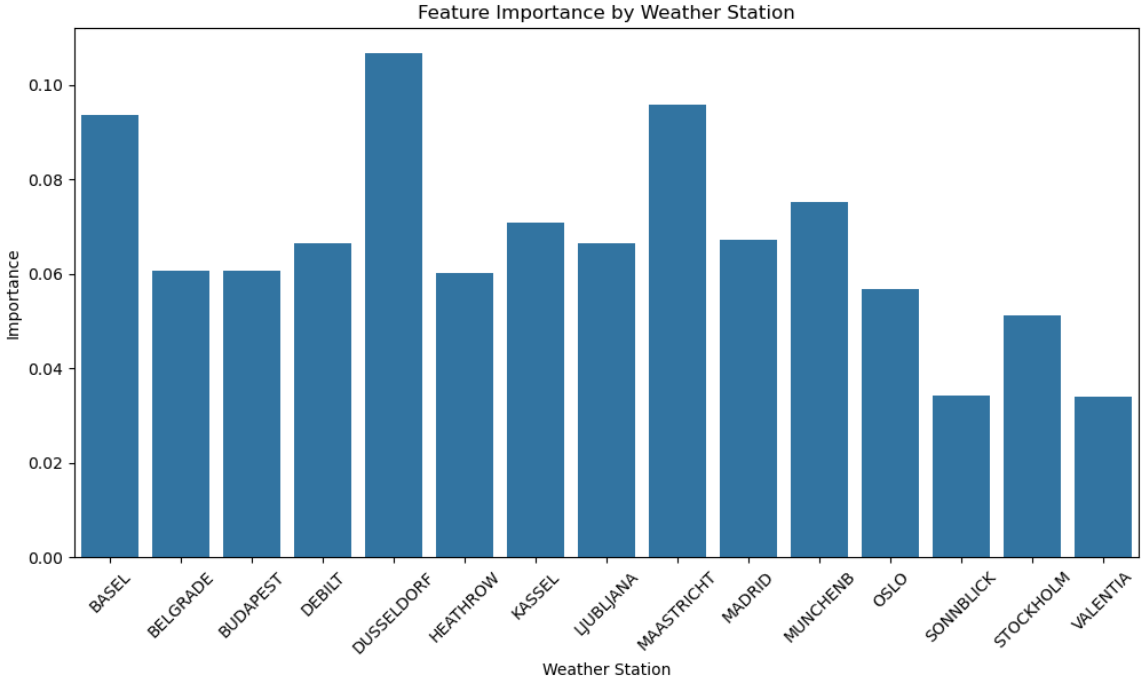
2.3 Complex machine learning models & Keras Part 2

Two different trees from Random Forest Model

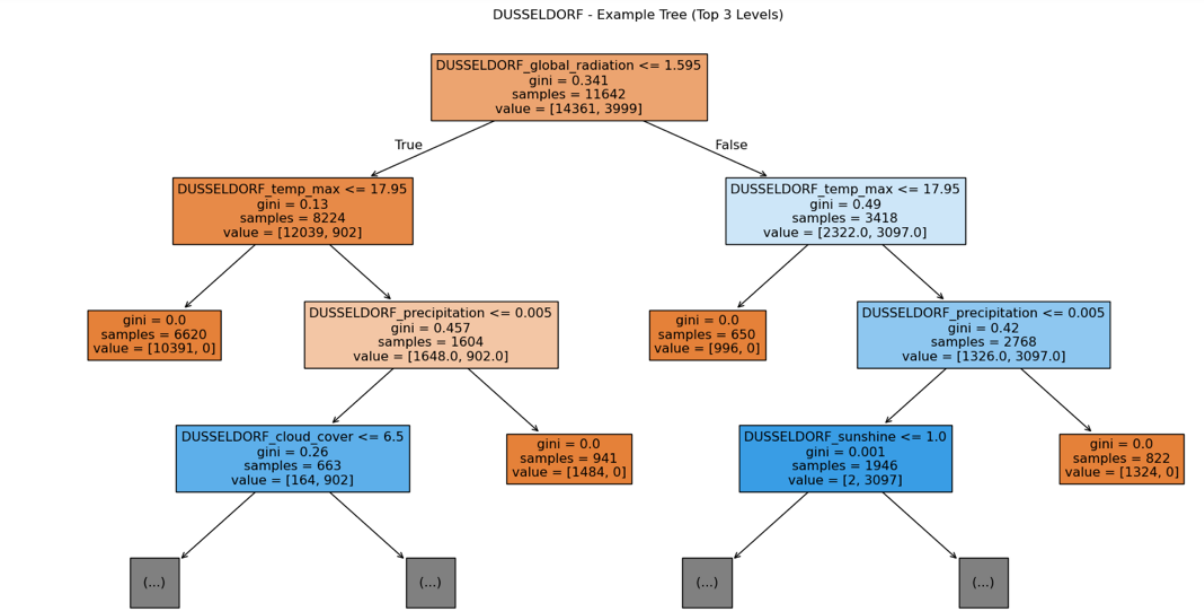




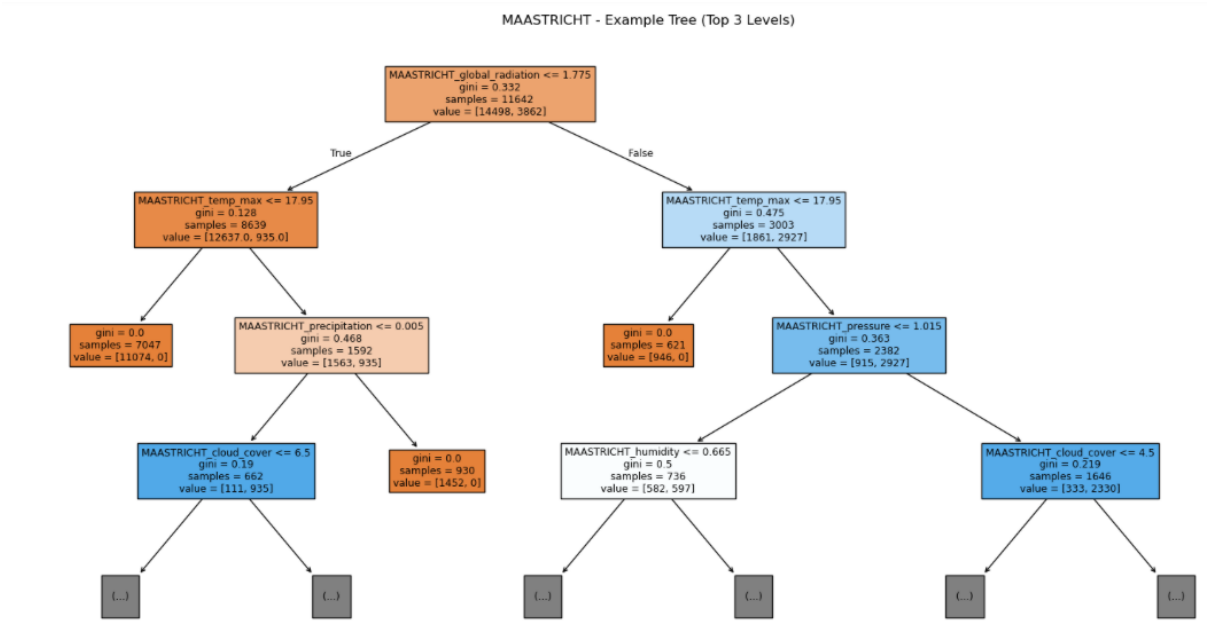
Bar Chart of Importance against Weather Stations



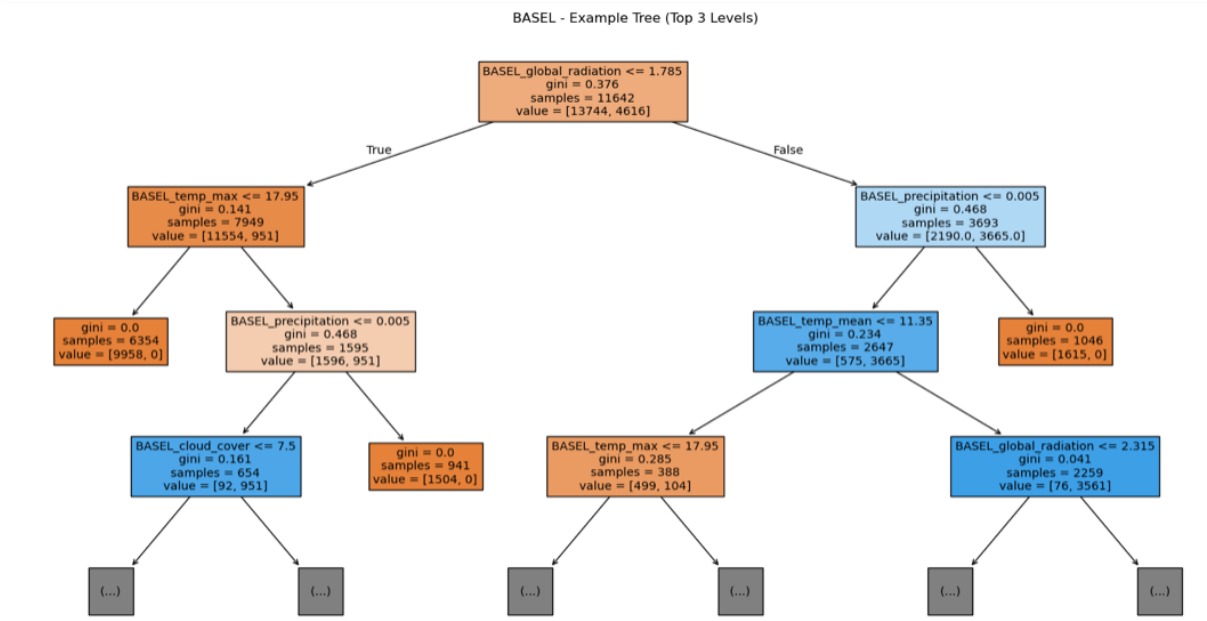
Random Forest Model for Each Station



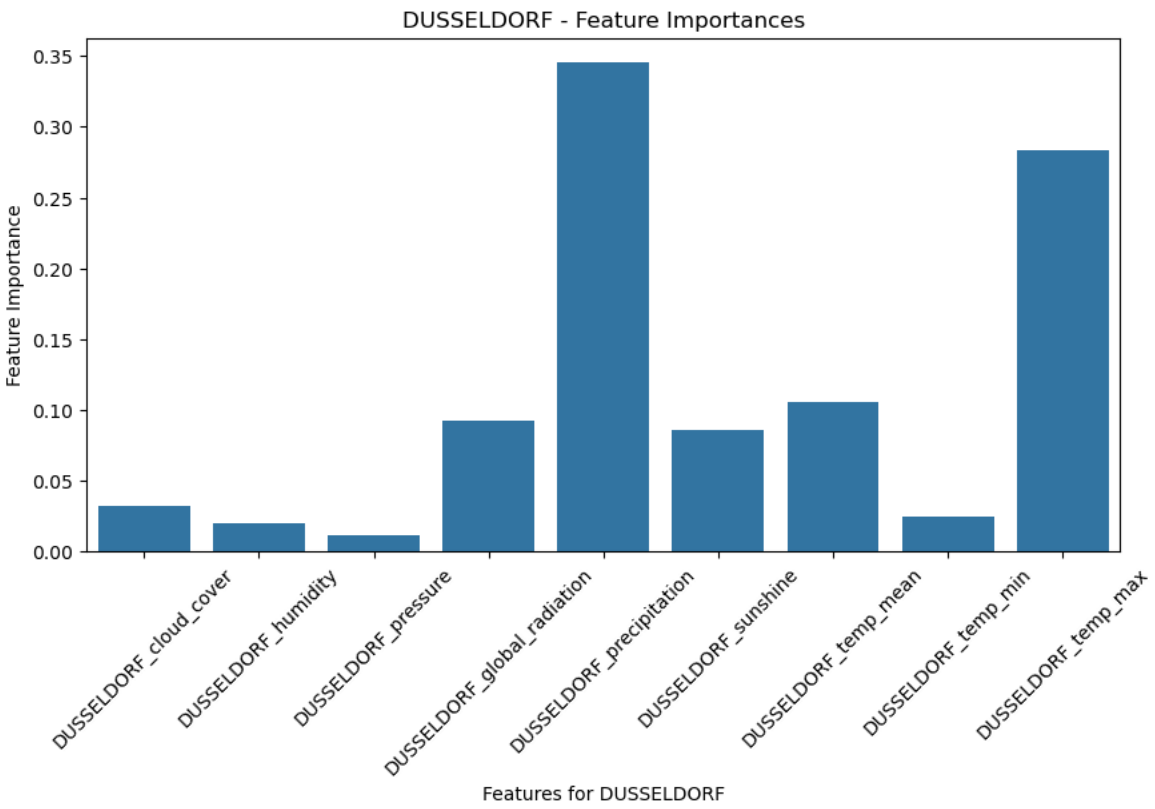
Training Accuracy – 1.0000
Testing Accuracy – 1.0000

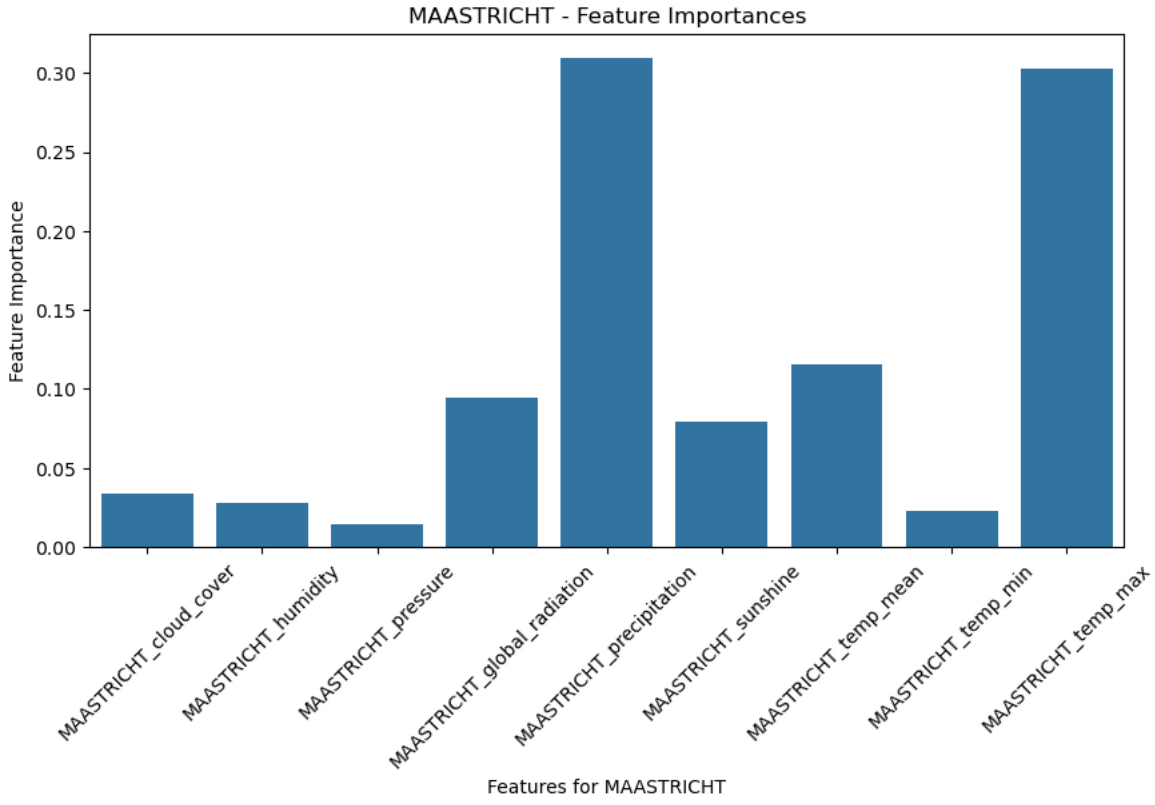


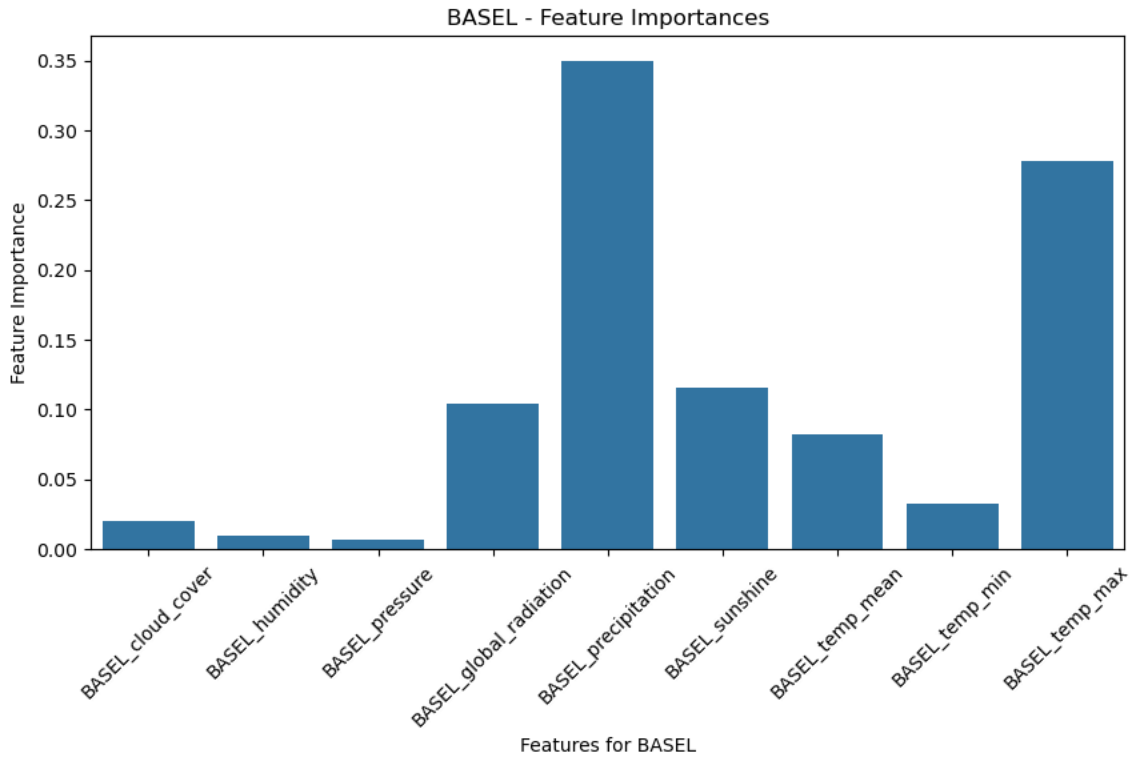
Training Accuracy – 1.0000
Testing Accuracy – 1.0000



Training Accuracy – 1.0000
Testing Accuracy – 1.0000


DUSSELDORF - Feature Importances
Feature Importance
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
DUSSELDORF_cloud_cover
DUSSELDORF_humidity
DUSSELDORF_pressure
DUSSELDORF_global_radiation
DUSSELDORF_precipitation
DUSSELDORF_sunshine
DUSSELDORF_temp_mean
DUSSELDORF_temp_min
DUSSELDORF_temp_max
Features for DUSSELDORF


MAASTRICHT - Feature Importances
Feature Importance
0.00
0.05
0.10
0.15
0.20
0.25
0.30
MAASTRICHT_cloud_cover
MAASTRICHT_humidity
MAASTRICHT_pressure
MAASTRICHT_global_radiation
MAASTRICHT_precipitation
MAASTRICHT_sunshine
MAASTRICHT_temp_mean
MAASTRICHT_temp_min
MAASTRICHT_temp_max
Features for MAASTRICHT



Conclusion

Across all three top stations — Düsseldorf, Maastricht, and Basel — global precipitation emerged as the most important indicator for predicting whether a day will be pleasant, with feature importance values between 0.32 and 0.35. For Maastricht and Basel, maximum temperature followed closely (around 0.30), suggesting that temperature extremes also strongly influence pleasant-weather predictions. Other consistently important indicators included mean temperature, global radiation, and sunshine duration, though their rankings varied slightly by station. The repeated dominance of precipitation and temperature measures across geographically different locations suggests these variables should be prioritised for future climate-tracking investments. Enhancing the resolution and accuracy of these sensors may yield the greatest improvements in forecasting pleasant weather events.