

QUEEN'S UNIVERSITY BELFAST

ELE8096 WIRELESS SENSOR SYSTEMS

Coursework 2

Linear Regression

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Abstract

1 Introduction

[1].

2 basic statistics

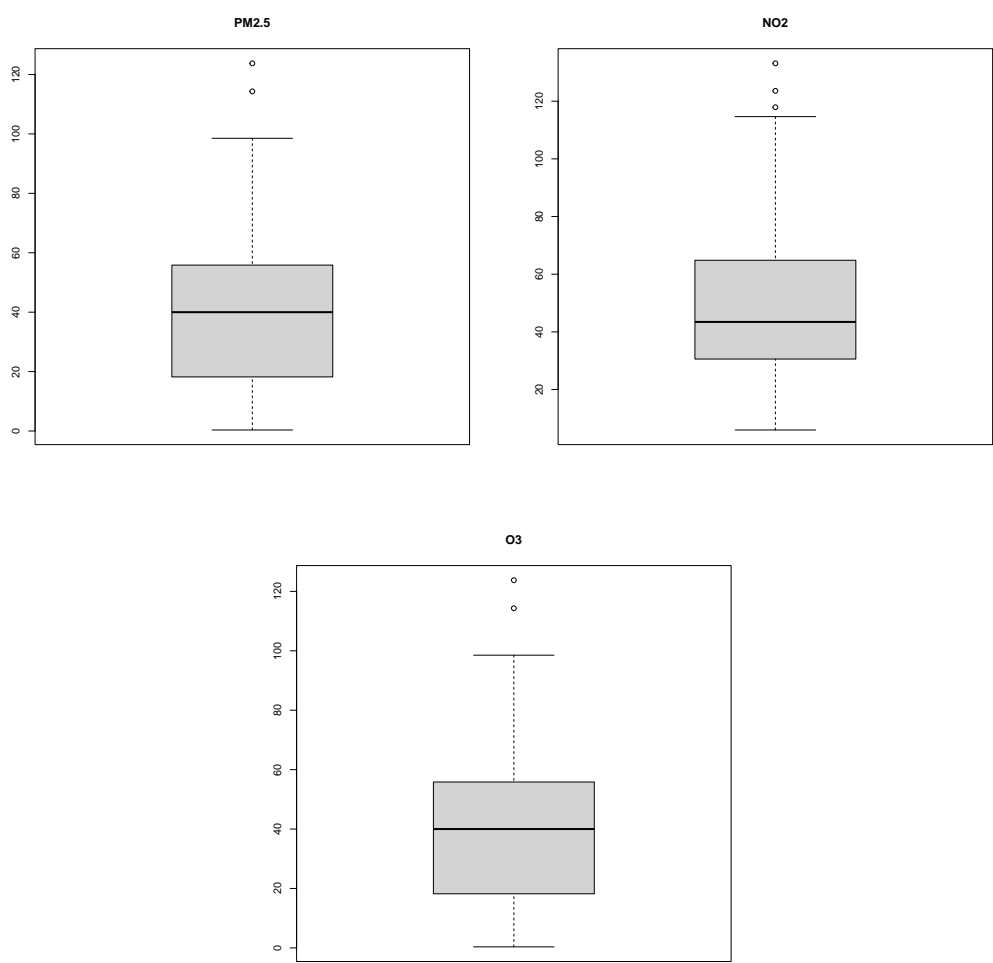
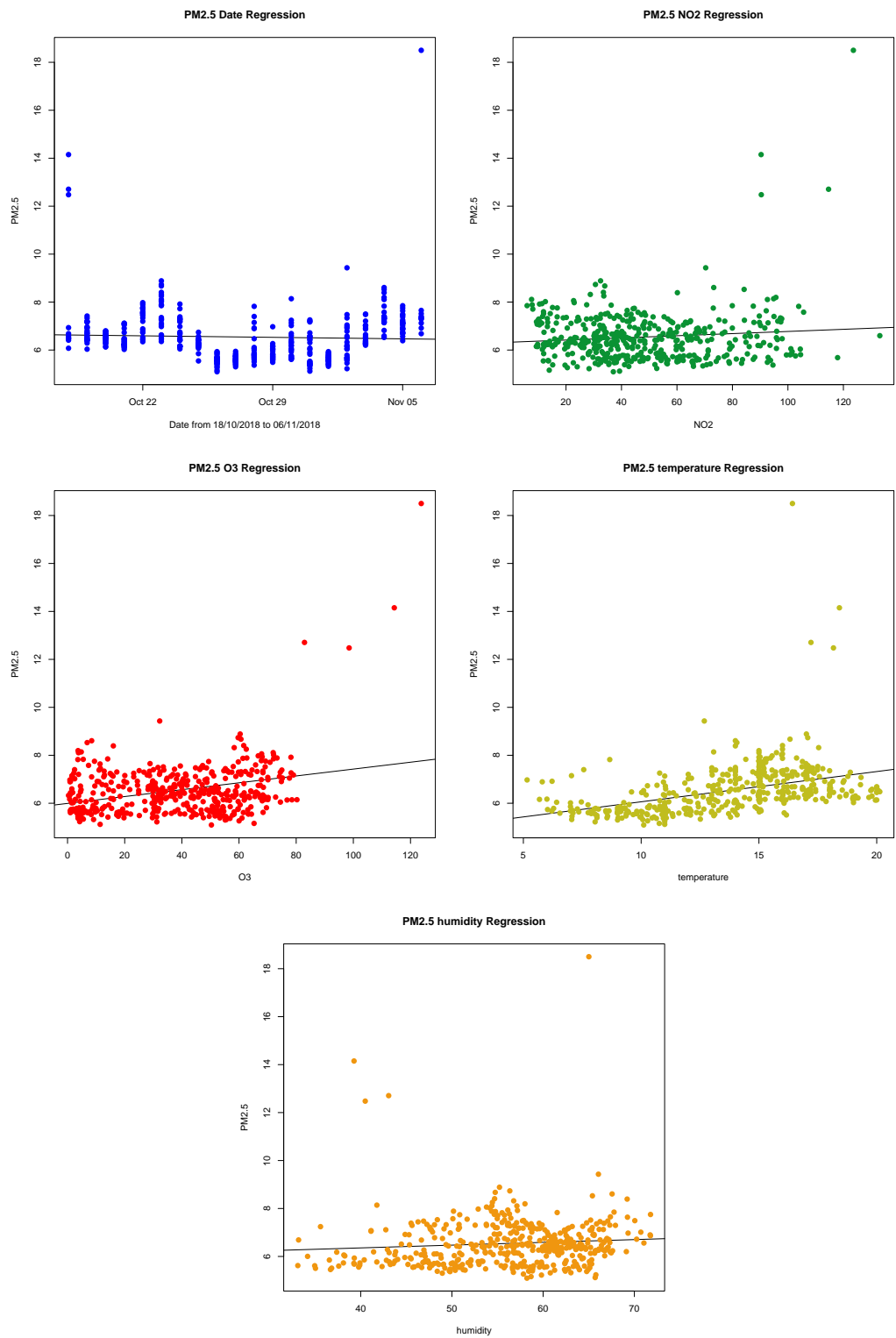


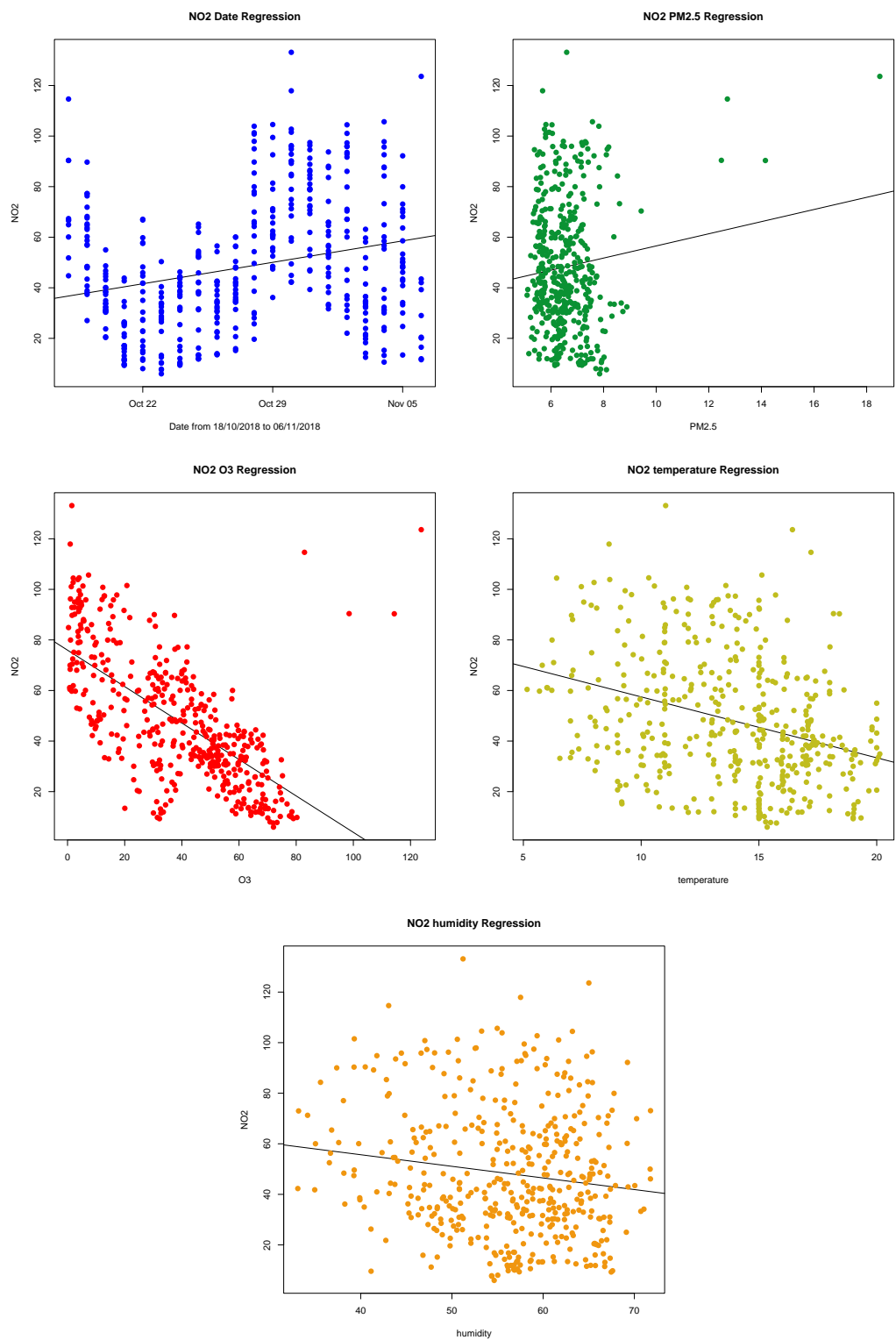
Figure 1: PM2.5 box

3 more advanced statistics

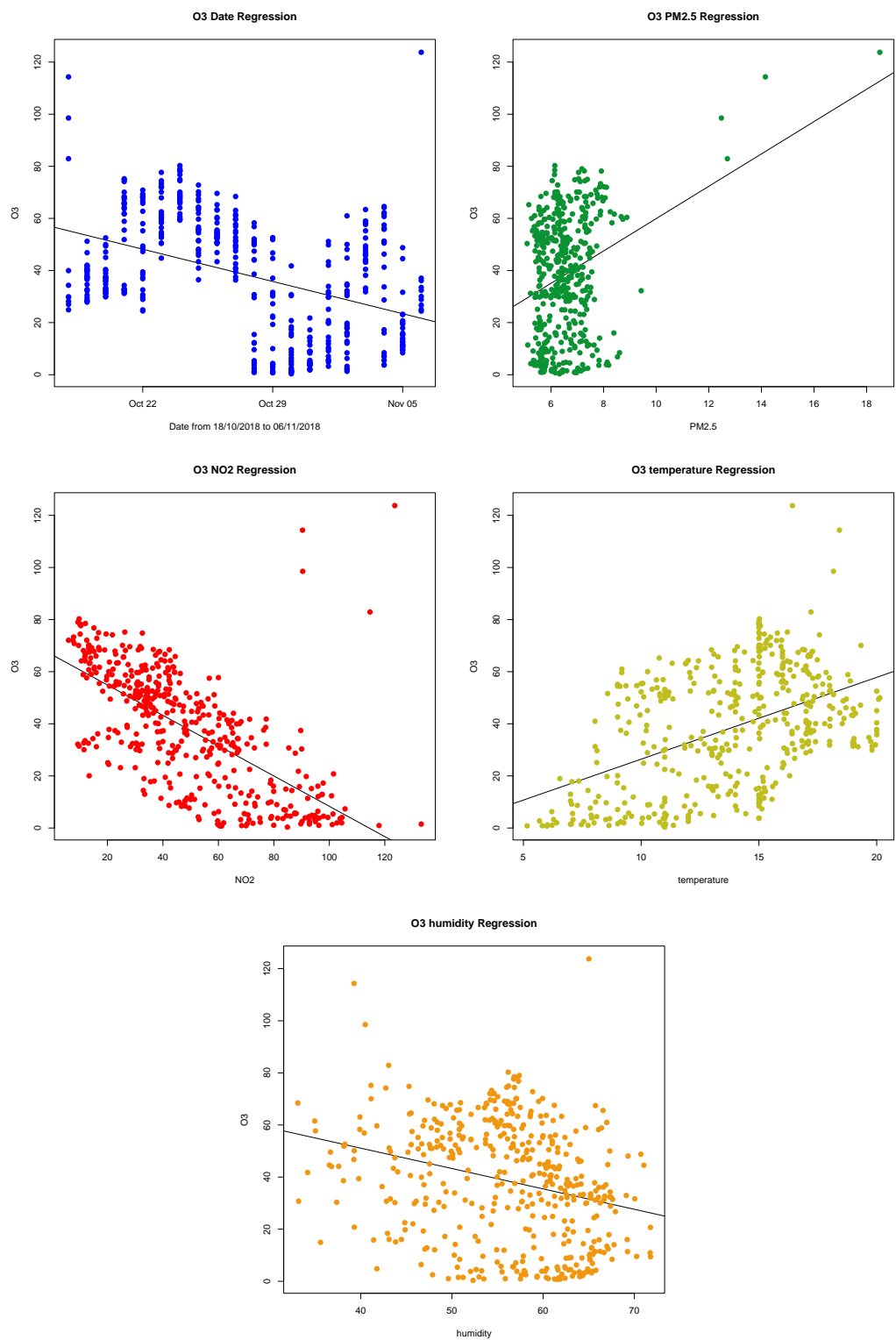
3.1 PM2.5



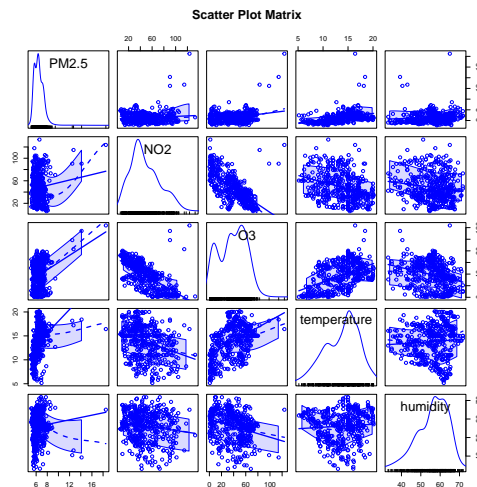
3.2 NO2



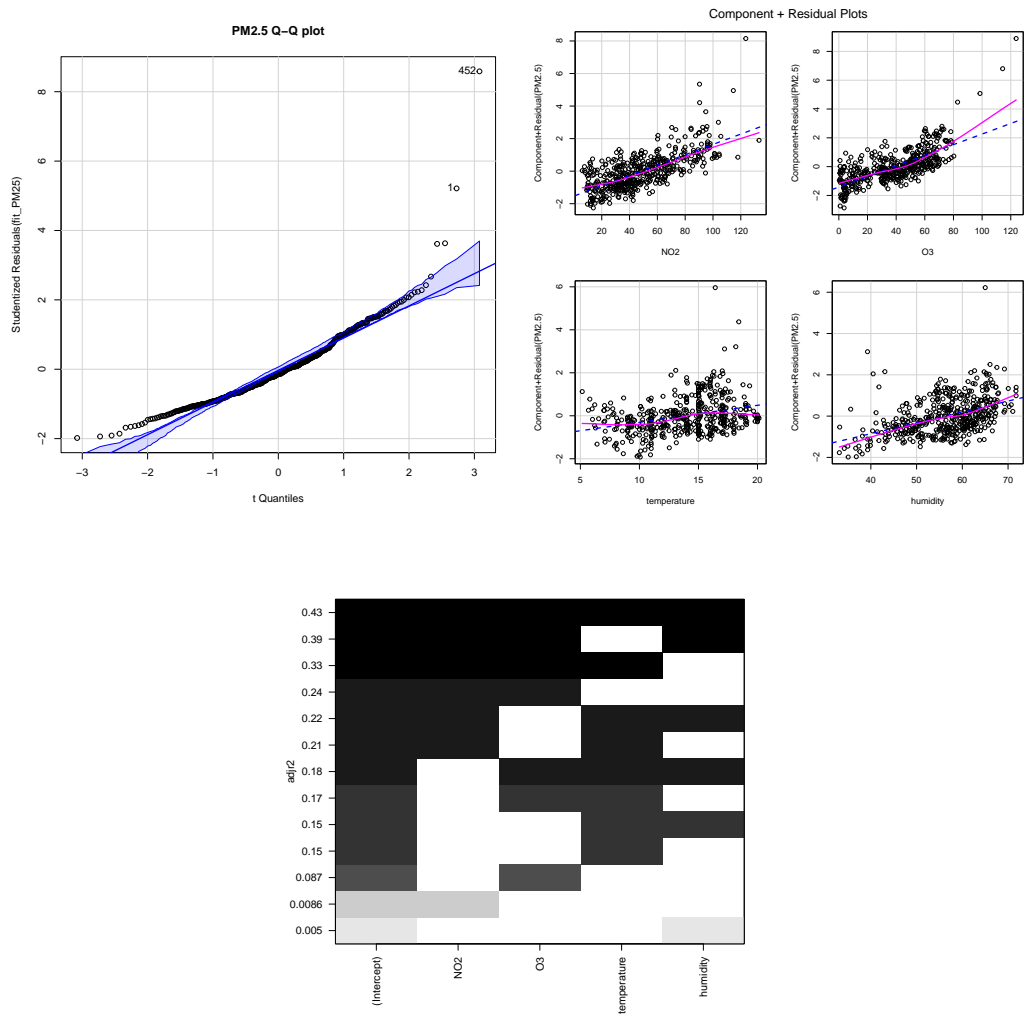
3.3 O3



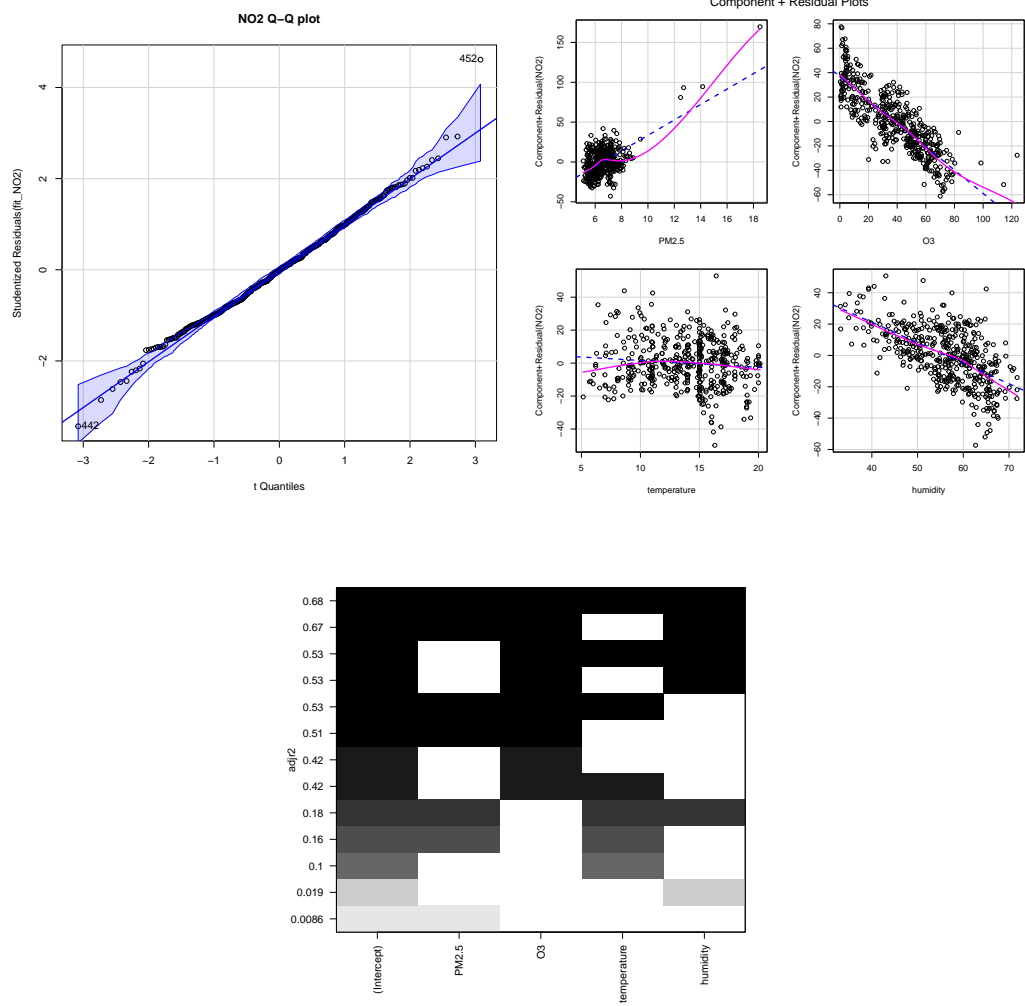
4 multi variable regression forecasting models, visualisation of results



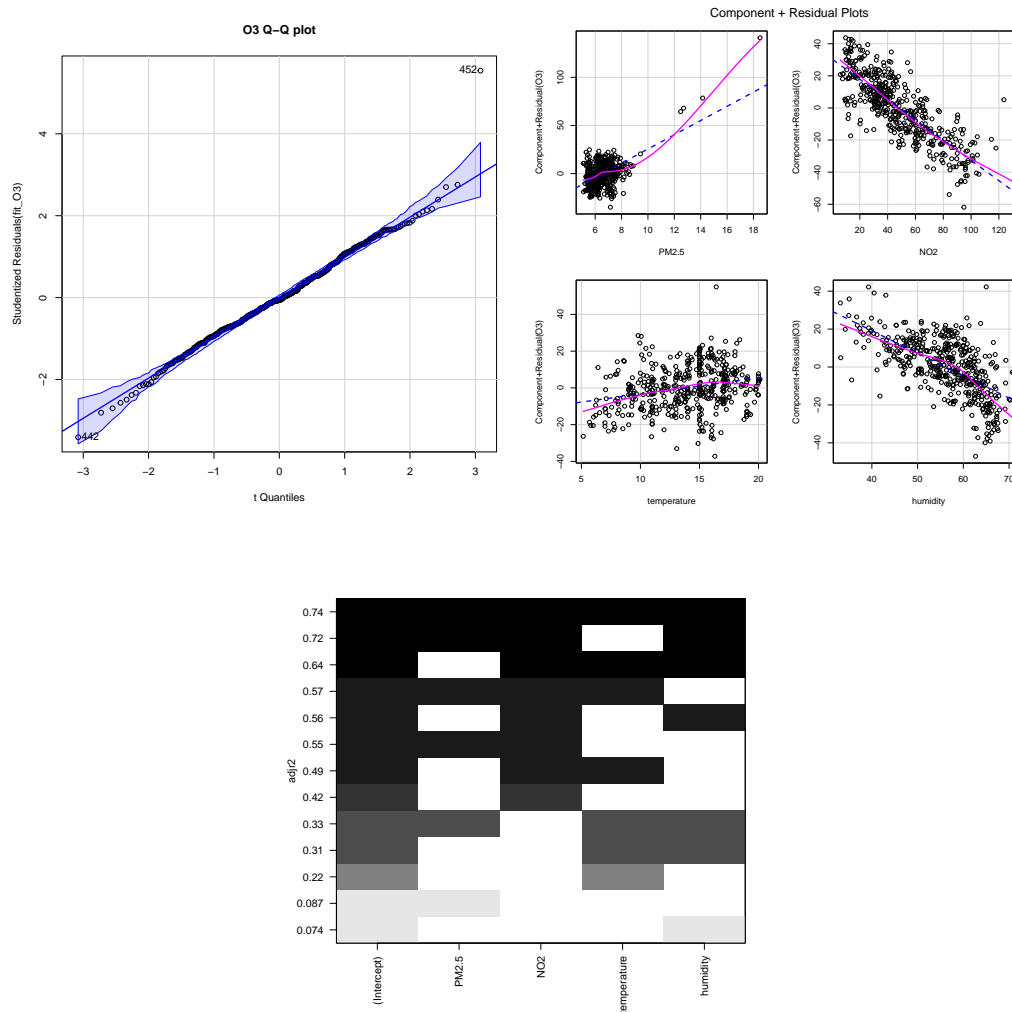
4.1 PM2.5



4.2 NO2



4.3 O3



5 model performance and discussion of results

We can use the function "outlierTest" to find the outliers in data. The output is:

```

1 > outlierTest(fit_PM25)
2      rstudent unadjusted p-value Bonferroni p
3 452 8.585952          1.5164e-16   6.8539e-14
4 1   5.212401          2.8566e-07   1.2912e-04
5 > outlierTest(fit_NO2)
6      rstudent unadjusted p-value Bonferroni p
7 452 4.611271          5.2351e-06   0.0023663
8 > outlierTest(fit_O3)
9      rstudent unadjusted p-value Bonferroni p
10 452 5.543088          5.0943e-08   2.3026e-05

```

Then, we delete the outliers and make regression again, the model performance will be better.

6 Conclusions

References

- [1] U. E. P. Agency, “Basic information about no₂,” <https://www.epa.gov/no2-pollution/basic-information-about-no2#Effects>, 2021.