Comparison of air quality data between Zaragoza and the UK during the Covid-19 pandemic to predict future atmospheric changes.

Irene Monreal Campos | imc520@york.ac.uk | Department of Chemistry | Supervisors : Prof. James Lee and Dr. Will Drysdale

Aims and methodology

Preventative measures taken around the world to stop the SARS-CoV-2 virus had an important effect on air quality. These changes could help predict future atmospheric conditions.

Variations in UK air quality were compared to those in Zaragoza (Spain) using the same methodology (Lee et.al., 2020). A business-as-usual (BAU) scenario was calculated by averaging air quality data from 5 years before the pandemic. Data from 2020 and 2021 was then compared to this BAU scenario to analyse the changes.

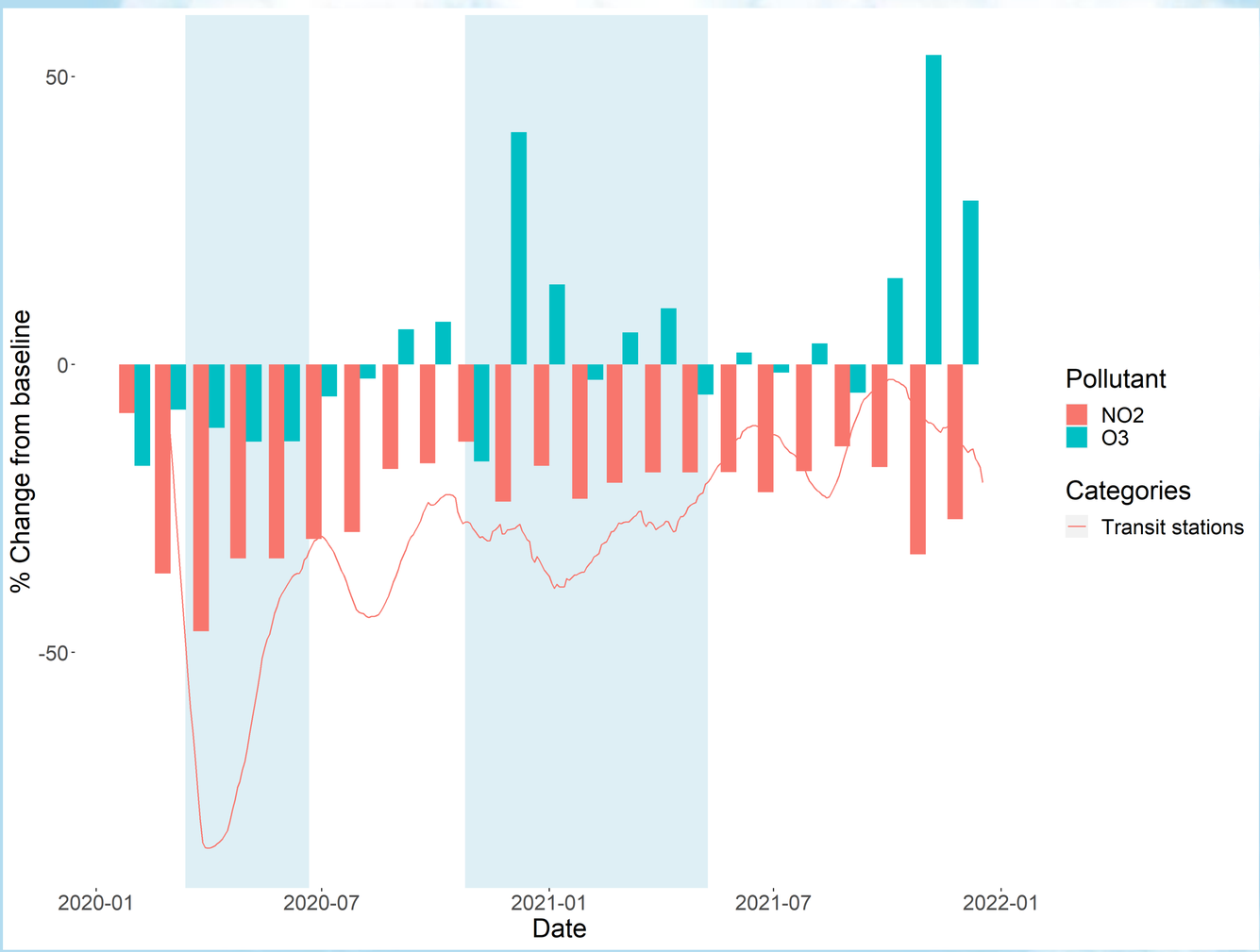
Results

NO2

Monthly mean NO2 levels dropped (-46.33±56.19)% in April 2020 and (-23.82±17.95)% in December 2020. These changes can be attributed to severe mobility restrictions in those months.

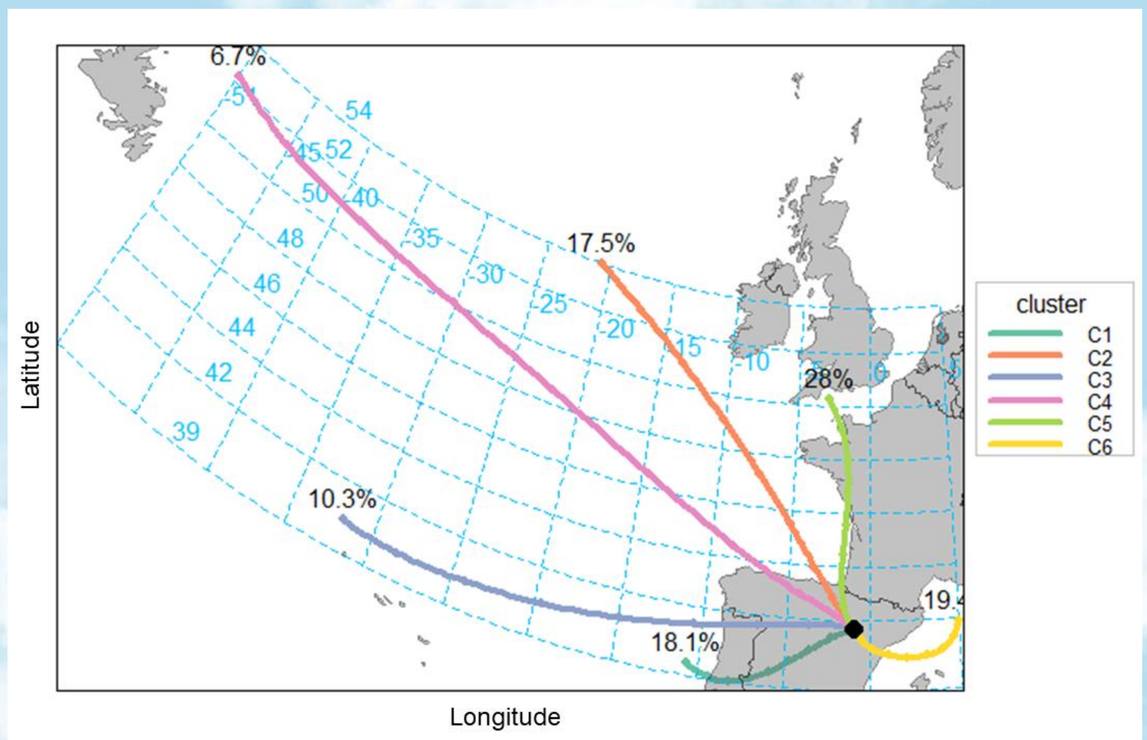
O3

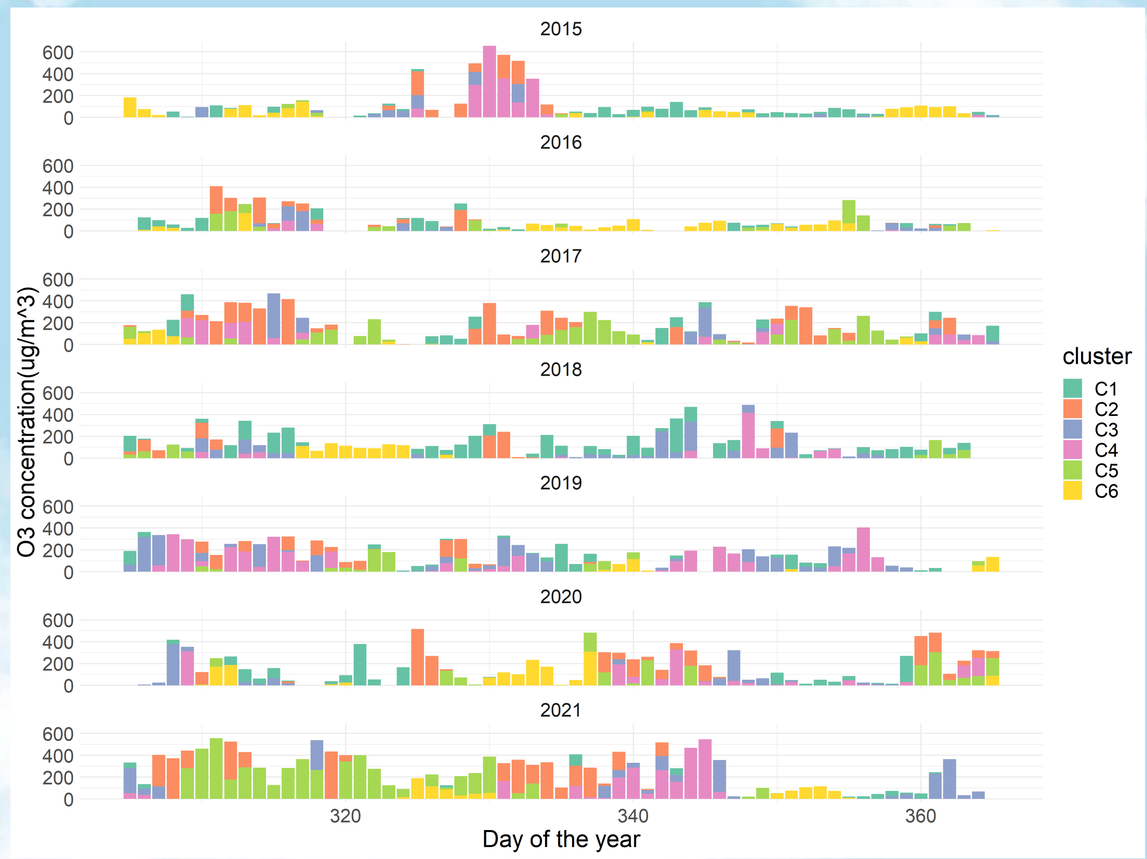
Mean O3 levels decreased up to (-13.40±8.70)% in May 2020. Notable increases occurred in December 2020 and November 2021 suggesting no obvious correlation with pandemic associated restrictions.



O3 Back trajectories

The HYSPLIT model calculated ozone back trajectories in Zaragoza and showed that those high ozone concentrations occurred when masses of air came from the north (C2, C5). This had not occurred in previous years.





Conclusions

O3 concentrations do not seem to be inversely proportional to NO2 concentrations. It is suggested that increases in ozone in Zaragoza are due to external factors and it is still unclear how the reduction of NO2 emissions in the future will affect them.

Using the BAU method in places with many meteorological variations makes it very challenging to predict alterations. The use of machine learning techniques seems to be a more accurate approach to calculate BAU scenarios, as well as the study of other pollutants.

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