

- Ground based observations are used to bias-correct model data and minimise known systematic biases at the surface. Biases can be attributed to model performance as well as difficulties in evaluating coarse resolution models with point observations.
- Ground based observations have limited spatial coverage in the horizontal (raising questions of representivity) and the vertical (limiting model evaluation away from the surface-atmosphere boundary.)
- To accurately represent pollutant concentrations at the ground, we must be able to accurately represent pollutants aloft.
- Observational datasets aloft are limited, particularly those sampling over extended periods.

These limitations in observational data currently available for model evaluation provide motivation (with a particular focus on the need for observations away from the surface) for the project:

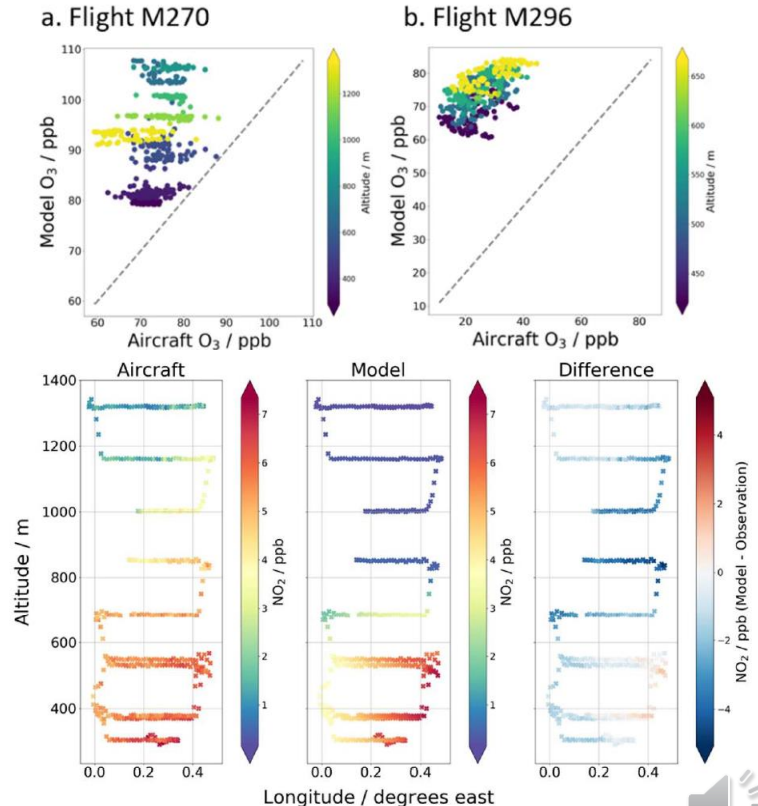
Long-term airborne measurements of pollutants over the UK, including during the COVID-19 pandemic, to support air quality model development and evaluation

A Mynard et al, 2023, AMT



What do the project outcomes enable us to do that we couldn't before?

- To study pollutants aloft, over extended time scales (over 150 hours sampling over 3 years).
- Observations designed to augment OSCA mast and AURN ground based observations to allow detailed analysis of expanse of the column.
- Gain deeper understanding of complex processes which can be leveraged to provide predictive capability extending spatially and temporally beyond the ground-truth.
- Early analysis has identified model/observational discrepancies that provide handles for further investigation
- a unique and valuable resource with which to explore changes in atmospheric composition associated the COVID-19-impacted period



Plans to create impact?

- Use the new database to evaluate and verify new Met Office Air Quality model schemes.
- Help gain better understanding of the chemistry/physics throughout the column. Can these new understandings help minimise the reliance of ground-truth bias corrections?
- Advertise dataset availability.
- Publication of future reports and papers using the dataset.

Associated challenges:

- Advertising the availability of database (soon to be on CEDA. Paper in review) The more people using it, the better.
- Seminars (currently internal only – could go further but what's out there? Who's interested?)
- Timescales: data (months) > future papers (long term, years) > Strategies for mitigating the impacts of air pollution (>>>years)

