EGU2020-8233
https://doi.org/10.5194/egusphere-egu2020-8233
EGU General Assembly 2020

Measurement of NOx and Ozone over the North Atlantic Ocean.

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Tropospheric ozone (O_3) can adversely affect human health and environmental ecosystems and it is therefore vitally important to understand its formation pathways from both natural and anthropogenic precursors. Background O_3 levels in the Northern Hemisphere have increased by more than a factor of two over the last century and it is believed that this increase is strongly tied to the increase in and distribution of anthropogenic nitrogen oxide ($N0_x$) emissions. This is important as the changing level of O_3 in the background troposphere impacts the ability of countries downwind to achieve their air quality standards.

As part of the NERC funded North Atlantic Climate System Integrated Study (ACSiS) and Methane Observations and Yearly Assessments (MOYA) projects, multiple research flights have taken place over the North Atlantic Ocean, spanning an area from 55^{o}N to 12^{o}N and 8^{o}W to 25^{o}W using the UK's large research aircraft (The Facility for Airborne Atmospheric Measurements – FAAM). Flights took place in all seasons from 2017 – 2020. A variety of gas and aerosol measurements were made, including NO_x, O_3, CO and a range of VOCs and an overview of the data is presented here. Measurements were taken in a range of air masses, including biomass burning outflow from West Africa, urban outflow from Europe and emissions from the busy shipping lanes to the West of Portugal.

Data was analysed to assess O_3 formation from the different emission sources, in particular examining the difference between anthropogenic and natural emissions. In addition, the output of regional chemistry models is compared to the data in order to assess the performance of the models in predicting O_3 and its precursors.