



Measuring Shipping Emissions via MAX-DOAS in Auckland, New Zealand

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Multiple-AXis Differential Optical Spectroscopy (MAX-DOAS) measurements were taken recently from the DTA ground station in Whangaparaoa, a suburb of Auckland, New Zealand, as well as from Devonport, which is much closer to the CBD. The goal was to examine the pollutant emissions from ships in the vicinity, namely large container ships as well as the occasional cruise liner, in order to assess their contributions to local air quality.

MAX-DOAS measurements have the potential to remotely sense several trace gases simultaneously such as NO_2 , HCHO and SO_2 . In particular, if signatures of NO_2 and SO_2 are detected, the NO_2/SO_2 ratio can provide an indication of the type of fuels being used by individual ships. By examining the above two sites (and using AIS) one could determine if fuels have been changed when travelling into the Auckland harbour. This has future implications as the sulphur content of allowed shipping fuels is predicted to decrease substantially with NZ's envisioned compliance of Annex VI.

Finally, when coupling MAX-DOAS measurements of the $\text{O}_2\text{-O}_2$ collisional dimer (O_4) with radiative transfer modelling, aerosol information, in particular aerosol optical depth (AOD) and aerosol layer height may also be found. This presentation will discuss preliminary results from these MAX-DOAS measurements and attempt to assess the relative contribution of shipping to the total pollutant emissions in the CBD of Auckland, New Zealand.