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# MAX-DOAS measurements of tropospheric trace gases during the AQABA campaign in late summer 2017.

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The ship route of the Air Quality and Climate Change in the Arabian Basin (AQABA) campaign led from Toulon in France to Kuwait and back between June and September 2017. The campaign was set out to characterize the atmospheric composition under a variety of conditions, with clean air in the Mediterranean and the Arabian Sea, air pollution near the oil fields in the Arabian Gulf or in areas of dense ship traffic like the Suez Channel or the dust clouds of the nearby deserts in the Red sea. Aboard the Kommandor Iona we performed Multi-AXis (MAX)-DOAS measurements in the UV/VIS spectral range with the aim to characterize the different atmospheric conditions by deriving profiles of aerosol extinction, nitrogen dioxide ($NO_2$), sulphur dioxide ($SO_2$) and formaldehyde (HCHO) using the MAinz Profile Algorithm (MAPA). For this purpose the telescope of the MAX-DOAS instrument was equipped with an angular stabilization in order to also yield profile information during rough sea conditions. Furthermore, we attempt to retrieve information on bromine oxide (BrO), iodine oxide (IO) and glyoxal (CHOCHO) from the measured spectra.

Pollution from anthropogenic sources were found in areas with high ship density like the Suez Channel, the Bab Al-Mandab Strait or the Strait of Hormuz where $NO_2$ and $SO_2$ are abundant, and in areas with a strong presence of petrochemical industries like the southern Suez Channel and the Arabian gulf with high concentrations of HCHO and $SO_2$. Measurements in the southern Red sea were strongly affected by desert dust.