Geophysical Research Abstracts
Vol. 20, EGU2018-15811-1, 2018
EGU General Assembly 2018

Imaging DOAS NO_2 measurements during the AQABA ship campaign

Lisa Behrens (1), Andreas Hilboll (1), Andreas Richter (1), Enno Peters (1,4), Steffen Dörner (3), John P. Burrows (1), Mihalis Vrekoussis (1,2)

(1) Institut für Umweltphysik, University Bremen, Germany (lbehrens@iup.physik.uni-bremen.de), (4) Deutsches Zentrum für Luft- und Raumfahrt (DLR), Bremerhaven, Germany, (3) Max Planck Institute for Chemistry, Mainz, Germany, (2) The Cyprus Institute, Nicosia, Cyprus

Ship-based air quality measurements were conducted during the field campaign “Air Quality and Climate Change in the Arabian Basin” (AQABA) in late summer 2017 on board the research vessel “Kommandor Iona”. The vessel went from Toulon (France) to Kuwait City (Kuwait) and back, passing the Mediterranean Sea, the Red Sea, the Arabian Sea, and the Arabian Gulf. The crossed areas are characterized by different atmospheric composition. For example, strong pollution events were expected in the Arabian Gulf (passing oil /gas rigs) or the Red Sea (ship traffic) with potential dust events whereas in the Arabian Sea clean marine air was expected.

The imaging differential optical absorption spectrometer (DOAS) “IMPACT” was installed on board the research vessel. This type of spectrometer is able to perform measurements in multiple viewing directions simultaneously and therefore, the spatial and vertical distribution can be measured at high resolution. The instrument was pointing to the horizon looking into three azimuth directions, starboard, port side, and to the front.

We investigated the temporal variability and identified the spatial gradients of nitrogen dioxide (NO_2) along the cruise. Stratospheric NO_2 shows the expected latitudinal distribution with the known diurnal cycle. Additionally, tropospheric NO_2 pollution was observed, for example, during the arrival at Malta and the departure from Kuwait as well as when passing oil and gas rigs in the Arabian Gulf. The magnitude and location of these high NO_2 events is discussed including their vertical distribution and possible sources.