

## 2.117 Formaldehyde over the Persian Gulf and around the Arabian Peninsula - marine boundary layer measurements during the AQABA campaign .

Early Career Scientist

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Abstract:

The AQABA (**A**ir **Q**uality and Climate Change in the **A**rabian **B**asin) measurements campaign characterized various trace gas and aerosol species in the Persian Gulf area and around the Arabian Peninsula. Starting in Toulon, France, the research vessel Kommandor Iona passed through Suez Canal, the Red Sea and the Indian Ocean into the Persian Gulf with Kuwait as the halfway point. In this field campaign air with different characteristics has been sampled, i.e. representing clean conditions combined with dust events, aged pollution, ship emissions as well as the unique air masses over the Persian Gulf - freshly emitted hydrocarbons and OVOCs mixed with hot dusty air coming from Kuwait under humid conditions, strong solar radiation and high ozone levels. Formaldehyde (HCHO) can be used, with its rather short lifetime, as a tracer for fresh pollution caused by the oil and gas industry near the Persian Gulf and in the Suez Canal. It is produced by the oxidation of VOCs, mainly methane, and by the combustion of fuels. Therefore, to avoid local contamination, the dataset was filtered to remove stack emissions caused by the own or passing ships thanks to simultaneous NO observations. HCHO mixing ratios in the Suez Canal reached a maximum of 7.6 ppb with a mean of 1.9 ppb during the first and 1.2 ppb during the second leg. The northern Red Sea (1.3 and 0.7 ppb) showed higher pollution than the southern part, where the lowest HCHO ratios were

detected (0.4 and 0.3 ppb). In the Persian Gulf area (4.5 and 2.3 ppb), two pollution events with values up to 12.1 ppb were probably caused by the emissions of oilrigs. The measurements have been compared to the global chemistry climate model (EMAC) showing a general good agreement, just overestimating the mixing ratios over the southern Red Sea.