

Interactive comment on “Shipborne measurements of total OH reactivity around the Arabian Peninsula and its role in ozone chemistry” by Eva Y. Pfannerstill et al.

Anonymous Referee #1

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The manuscript describes the measurements of OH reactivity made using the comparative reactivity method (CRM) on a shipborne platform during the Air Quality and Climate Change in the Arabian Basin (AQABA) campaign in 2017. Detailed analysis of the measurements is provided, using supporting measurements of VOCs and other trace gases to determine the sources of reactivity and the contributions to the total OH reactivity from different classes of compounds. Measurements of atmospheric composition and OH reactivity in this region are under-represented, with this work providing important insights to the emissions and chemistry in this area. The paper is well written, within the scope of the journal, and will be of interest to the atmospheric science community. I recommend publication once the following minor points have been ad-

C1

dressed:

Page 1, line 30: Please state the measurement uncertainty. Does this result imply that oxidation products of primary emissions have been measured in this campaign or that contributions to the OH reactivity from oxidation products is low in this region?

Page 4, line 15: Is there any impact of the length or the heating of the inlet on the trace gases sampled? While wall losses of gases may be reduced by heating, are there any other effects that need to be considered? Have any experiments been performed to test that the length and heating of the sampling line do not impact the concentrations of VOCs?

Page 4, line 28: Is the ratio of pyrrole to OH sufficiently high to ensure pseudo-first-order conditions?

Page 4, line 31: What was the variability in the measurements of C1?

Page 5, line 5: Please provide a summary of the VOC measurements and limits of detection.

Page 5, line 20: What is the typical percentage correction in the total reactivity? For the maximum correction of 7.4 s⁻¹, what was the total reactivity?

Page 5, line 26: Please provide some further details explaining the basis for the corrections.

Page 6, lines 8-13: Please consider providing supplementary information which includes further details of which species were calibrated using gas standards and which masses have estimated concentrations.

Page 6, line 12: ‘Formulas’ to ‘formulae’.

Page 6, section 2.5: Can an estimate of the total uncertainty in the calculated reactivity be provided?

C2

Page 10, lines 12-19: The use of the ratio between C3 carbonyls and propane to determine the age of the air mass must assume there are no direct emissions of C3 carbonyls. Please provide some comments on the validity of this assumption.

Page 14, section 3.4: Does the extent of missing reactivity correlate with the estimated age of the air masses?

Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2019-416>, 2019.