

Interactive comment on “Non Methane Hydrocarbon (C₂–C₈) sources and sinks around the Arabian Peninsula” by Efstratios Bourtsoukidis et al.

Anonymous Referee #1

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The authors measured speciated hydrocarbon concentrations from a research vessel that traveled around across the Mediterranean Sea, through the Suez Canal, and around the Arabian Peninsula. This region is both data-scarce and source-rich, especially in the Persian Gulf where there are extensive Oil & Gas (O&G) activities. Analyses of the data presented in the manuscript lead to interesting findings about sources that contribute to observed hydrocarbon levels, as well as the importance of various chemical removal processes such as reactions with the hydroxyl and chlorine radicals. I recommend the paper be accepted after minor revisions are made to address the following comments.

C1

1. The authors need to consider more carefully the precision of measured data and calculated ratios. It is not reasonable to report measured values with 4 or 5 digits of precision given what the authors have written about uncertainties in the measurement methods (see first paragraph on page 6). Based on what the authors have written there, I would say two digits of precision could be readily justified, but no way should values be reported with four or five significant figures.

Table 2 requires rethinking and extensive revisions to report all of the tabulated results with defensible precision. This issue also arises on page 9: 13.33 ppb of ethene at line 6 and similarly in numerous instances between lines 11 and 19 on the same page. On page 10: I would write 0.81, 0.96 and 0.88 for the ERs, and at line 16, I would write 27 and 54 ppb. See also page 15, line 4, and page 16, line 33 (108220:1, which appears again on line 5 of page 41 in the last figure caption.

2. While some Arab governments prefer to use the term "Arabian Gulf", the main body of water between Iran and Saudi Arabia is still known internationally as the Persian Gulf. The authors should either use "Persian Gulf" or at least note the equivalence between Arabian Gulf and Persian Gulf in the text to reduce potential for confusion among readers. On page 7, line 20, Suez Gulf is typically referred to as the Gulf of Suez.

3. On page 9, line 5, the high ethene levels are linked to O&G activities, but to my knowledge O&G activities do not emit olefins. There can be a petrochemical source of ethene (e.g., in Houston) for example when ethane is converted to ethene and subsequently polymerized to make polyethylene. Also ethene is present in vehicle exhaust emissions.

4. Page 11, line 25, do you mean O&G instead of O&N here?

5. Page 13, lines 13 and 33, do you mean excess mole fraction? The meaning of "the mole fraction of this sample" is unclear.

C2

