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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Origin and variability of volatile organic compounds observed at an Eastern Mediterranean background site (Cyprus)" *by* Cécile Debevec et al.

Anonymous Referee #2

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Comments on the Manuscript Titled "Origin and variability of volatile organic compounds observed at an Eastern Mediterranean background site (Cyprus)"

This manuscript presents the on-line measurements of 24 volatile organic compounds (VOCs) during a field campaign at a background site of Cyprus in March 2015. Based on the measurements, the temporal variability of VOCs was investigated. Six major sources and corresponding origins of VOCs were addressed by time series analysis, PMF receptor model, as well as CPF and CF. Furthermore, the influences of biogenic and anthropogenic sources on VOCs compositions were distinguished by a combined analysis of VOCs PMF factors with source apportioned OA. The work described in this

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manuscript would definitely provide a better understanding of the air pollution of VOCs as well as their sources and fate impacting the Eastern Mediterranean region.

The comments on the manuscript are listed as follows.

1. Page 2-3: It would be better to shorten the "Introduction" part. For example, the second, third and fourth paragraphs in this part on page 2-3 would be shortened by removing certain general information.

2. Page 8 / Line 15-24: The "Off-line VOCs measurements" part on page 8 would be removed since data obtained by off-line measurement have not been used in this manuscript.

3. Page 8 / Line 27-30: The comparison of measurements between PTR-MS and GC-FID shows low intercept of 0.10 μg.m-3 for benzene and 0.13 μg.m-3 for toluene, as stated in the manuscript. However, the intercepts would not be low enough when the mean concentrations observed at the CAO in this campaign (0.37 μg.m-3 for benzene and 0.19 μg.m-3 for toluene) are considered.

4. Page 14 / Line 3: It is stated that the CAO was affected by air mass originating from "West of Turkey" (Page 14 / Line 3). But in the most part of the manuscript, it is stated that the CAO was affected by air mass originating from "South of Turkey". And in Figure 18, the factor contributions to VOCs were similar when air mass were originated from West of Turkey (C5) compared to from Marine (C2). Does this indicate that the "West of Turkey" is clean area?

5. Page 16 / Line 10-11: The interpretation of low concentration of α-pinene in daytime would not be convincing. Both α-pinene and isoprene can react with daytime oxidants with lifetime of 1.4h and 2.3h respectively (please see "3.5.1" part). But high concentration was observed for isoprene in daytime, while low concentration was observed for α-pinene in daytime. Please provide more interpretation.

6. Page 20 / “3.5.3 Regional background (factor 6)”: It would be suggested to add a

clear definition of “regional background”. The definition would be helpful to understand the factor 6, since the source areas associated with factor 4, 5 and 6 are all South of Turkey or Southwest/Southeast of Turkey.

7. Page 23-25 / “4.2.2 Relationship between VOCs and OA”: It would be suggested to add p value asssociated with correlation coefficient (r). With the p value, it would be more convincing to state that the correlation is statistically significant.

8. Page 46 / Figure 5: The word "anthropogenic" in the caption of Figure 5 would be "biogenic"; the word "m69" in the fourth drawing would be "isoprene".

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