

## **Contrasting winter and summer VOC mixing ratios at a forest site in the Western Mediterranean Basin: the effect of local biogenic emissions**

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This paper gives very interesting information on temporal variation of VOC in a typical Mediterranean forest influenced by urban emissions. Despite the potential for biogenic VOC emissions and photochemical reactions in the Mediterranean area is high, these types of studies are scarce. In consequence, this manuscript can contribute to obtain valuable data on VOC emissions in the south of Europe.

Although the scientific quality of the manuscript is high, I include below some questions/suggestions to be taken into account before the final publication of the paper.

Page 20396, line 25: Describe the characteristics of VOC sampling: type of pump, sampling flux (mL/min), duration of sampling, number of cartridges used, etc.

Page 20399, line 2: Is there any other meteorological station in the vicinity of MSY confirming that during summer time wind speed was above the recorded values?

Page 20399, line 14: Explain in more detail why NO concentrations were so low at MSY, especially in summer season (for instance, conversion to NO<sub>2</sub> by higher O<sub>3</sub> concentrations). Are there other remote stations in Cataluña where the same phenomenon has been observed?

Page 20402, line 23: In my opinion, the justification of the increase of isoprene mixing ratio in summer due to the increase of biogenic emissions is enough. However, it is not so obvious that under summer conditions increased photochemistry would inhibit the mixing ratios of VOC. Although this may be true, there are also several factors that can contribute to the same fact. For that reason, if no data are presented to support this argument, I wouldn't include the sentence.

Page 20403, line 19: As mentioned in the text, acetonitrile is considered a biomass marker. The fact that the mixing ratio of this compound is much higher in summer (the double) suggests the influence of local or distance fires around the area of study. Do the authors have any information about the existence of fire episodes during the sampling period? If so, did these activities affect the concentrations of other organic compounds? Are there any small village around the forest site where biomass is used for heating in winter? If so, have you detected any influence of such type of activities?

Page 20404, line 16: Both biogenic and anthropogenic VOC mixing ratios are said to be linked to the mountain wind breezes. However, with the available information, authors cannot differentiate the percentage of contribution from each of these sources. Even in the case of typical biogenic compounds, like monoterpenes, data do not allow to extract certain conclusions about the source of these compounds, because the highest mixing ratios are detected when air masses are advected by the sea breeze (thus heavily affected from Barcelona city emissions). In order to confirm that biogenic VOC detected at MSY are locally emitted in the holm oak forest, it would be interesting to include some results from other type of studies (enclosed branches) supporting this hypothesis.

Page 20407, line 14: The relation between the wind regime and VOC mixing ratios doesn't seem to be very consistent. Have you found any significant correlation between both variables? It would be very interesting to see if this variation pattern is also present in other periods (not only during the 6<sup>th</sup> august).

Page 20408, line 3: This affirmation is based in hypothesis. Do you have any information proving that heath communities are lower VOC emitters than oak trees? Include some references.

Page 20408, line 20: This comparison is very interesting, as both types of areas are very similar. The different behavior between Castelporziano and the MSY site in relation with monoterpene mixing ratios is well explained in the text.

Page 20410, line 17: According to the authors, the most important factor governing VOC mixing ratios is the wind regime of the mountain. In my opinion, more meteorological information is needed to support, as some of the results seem to be based on conjectures. In a future work, it would be very interesting to achieve a similar study in a holm oak forest located far away from the influence of a big city like Barcelona. This could help to elucidate if the observed VOC mixing ratios are mainly influenced by mountain winds and it would also give more real information about the sources of such emissions.