

Interactive comment on “Night-time ozone uptake by Mediterranean species” by S. Mereu et al.

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This paper tackles two interesting questions, that of the estimation of nocturnal stomatal conductance and the consequent uptake of ozone with the help of sap flow measurements. Inasmuch as it deals with the land-atmosphere exchange it is suitable for the scope of biogeosciences. As is also the case for other papers in the special issue, the modest novelty of this paper lays in the type of ecosystem being measured and the combination of different types of measurements together.

I find the following points would need serious revision or reformulation, before acceptance of the manuscript for publication:

General comments

The title and the contents do not totally correspond to each other, there is actually only

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one section and one figure on the ozone uptake whereas there are a lot more on the technicalities of the estimation of the stomatal conductance. Perhaps the weight of the sections and figures should be changed or then change the title. Please, consider.

There is no doubt of the technical limitations to measure nocturnal stomatal conductance. I see this study is trying to overcome such limitations. Precisely because of that, the reader is missing some degree of quantitative analysis of the accuracy of the measurements. As it stand now, it gives the impression to be all at the edge of detection and behind many assumptions. It would be nice to not only recognize this but also provide a value for the associated uncertainty. Please, add.

The paper would also benefit from a more balanced presentation: if the authors decide to provide equations for the calculations then provide them for all. Foremostly, there are no equations showing the calculations behind the central methodology in the paper, the sap flow although they are showed for almost everything else, including EC equations that have an extremely little role in the whole paper. Please, revise

There are several points that definitively need better explanation:

1. in spite of the seemingly important role of the temperature measurements for the discussed results, there are far too little information on the technical aspects, accuracy, representatibility, of the measurements, specially for the leaf temperature measurements. In fact I actually wonder whether the discussion on the leaf temperature is essential to the paper or it could be omitted totally. The authours should explain their relevance if any.

2. the reader is informed of leaf wetness measurements but there is no obvious use for them. In fact the possible role of the nocturnal dew is not much taken into account for example when discussion the nocturnal cooling of leave, or whether it interferes somehow with the interpretation of the sap flow measurements.

3. the issue of the coupling of the vegetation is not clear. The authors should reason

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better they approach, which is not totally obvious. Also the result of the filter should be show, how often was it coupled and how often not? at what height was the wind measured in equation 2? how many leaves did you measure for the average? Regardless what the authors state, the improvement in the correlation E_n vs VPD is extremely modest. Please, reason better the use of such filter.

4. The authors talk about the height of interest being the average height of canopy (1.5m), why? Please, clarify

Some text needs revision or rephrasing:

2009 lines 8-9 this sentence sounds inadequately sharp. Much of the negligence in the knowledge of the nocturnal conductance comes from the fact that a huge portion of studies are related to photosynthesis, which is studied during light hours. Also, the potential interest in the nocturnal stomatal conductance has always encountered the technical problem of measuring gas exchange at low VPD and saturating RH (as the authors comment later). These technicalities are solved with other technologies such as sap flow. Please consider rephrasing or removal.

2011 line 15, the description given in Fares et al. is more complex and describes a site with patches of maquis and garigue communities. Please, clarify

Sectin 2.2 Please, provide more details on these sensors. How were the sensors placed in relation to the foliage, were the temperature sensors far away, close, or touching the foliage, on what side of the leaf? the three species have very different leaf anatomy, why did you measure temperature only from *Quercus*? where were the temperature sensors wrapped? did you use the average of the measurements and what was the variation? were the leaf wetness sensors under foliage or in open space and how far away from the closest foliage? were they painted? how did you calculate the relative frequencies shown in fig 1? position of the thermo-hygrometers?. What was the result of the intercalibration between Pt100 and 50Y, had they drifted from each other a lot? what accuracy do these temperature sensors have, less than 0.5 C? Please, clarify all this

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questions

2018 line 20-24, please provide more information on why 8 minutes reflects a small capacitance, provided the small size of the plants it could sound quite a delay. Perhaps a reference to maximum measured capacitances would enlighten the reader

2020 line 25 to 28 the range does not have anything to do with being able to achieve better correlation(!). The problem is that at lower values of VPD the noise of your measurements might be larger

Technical comments

2008 line 19, introduce (O3) after ozone, since it is the first time it appears

2008 line 20, remove (PP), since the expression does not appear again

2008 line 25, remove extra TO MEASURE

2009 line 2, you might have meant: AND not OR

2009 line 17 the symbol g_s has not been explained yet, please tell at this first appearance that it means stomatal conductance

2009 line 23 correct ENVIRONMENTAL

2011 line 19 add brackets around RH

2011 line 25 add brackets around T_a

2012 line 5 please give the n also for Quercus and Arbutus

2012 line 10 add brackets around ΔT

2012 line 20 sentence difficult to understand. Do you mean that 1min averages were recorded three times a day? Please clarify

2012 line 25 remove (RH), it has appeared already

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2014 line 19 –considered the most reliable one– is a very loose statement. Consider removal or rephrase.

2012 line 24 to 2013 line 1. This couple of sentences do not have any use here: in material an methods we do not want to be informed of what you did not use but of what you actually used. Consider removal or placing in another section

2016 line 7-8 clarify the role of the water table

2016 line 19 the figure does not show the higher concentrations after sunset but rather before sunset during the afternoon. Please, clarify

2017 line 3, clarify whether you refer to absolute or relative reduction in the sap flow

2018 line 11 consider CROWN instead of LEAVES

2019 whole last paragraph include three consecutive sentences starting with IN FACT. Please rephrase

2019 line 29 clarify what do you mean by THE LOWER ATMOSPHERIC STRATA. do you mean near the soil?

2020 line 23 Figure 6 shows a r^2 of 62 not 64

Table 1 arrange the numbers so that decimal periods are in line, i.e. justify the text column to the right.

Figures, in general it would be better to use the same symbols or line colours when representing the three species along the figures. Now each graphs is using different ways, sometimes symbols, sometimes colours and sometimes shades of grey. Please, harmonize. Also it would be nicer to show always data for the three species, now each graph have a different combination of all or only two of the species. Please, harmonize.

Figure 1, clarify what leaf temperature are you showing here, average of all measurements or only those for one species.

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Figure 2, please clarify in what direction the sea is.

Figure 3 it would be more clear if the symbols would be all used for the sap flow and the plain line for the LE, or the other way around, use symbols for LE and plain colour lines for the species

Figure 4 the colour in a) is not needed

Figure 4 add legend indicating what line belongs to what species

Figure 4 one of the three lines is not decreasing, please comment accordingly.

Figure 7 correct A. ARBUTUS to A. UNEDO

Interactive comment on Biogeosciences Discuss., 6, 2007, 2009.

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