

## ***Interactive comment on “Combined effects of ozone and drought stress on the emission of biogenic volatile organic compounds from *Quercus robur* L.” by Arianna Peron et al.***

### **Anonymous Referee #2**

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The manuscript entitled “Combined effects of ozone and drought stress on the emission of biogenic volatile organic compounds from *Quercus robur* L.” present interesting data about the ecophysiological and volatile emission response of *Quercus robur*, studying combined stress effects on plants which is a subject that needs to be investigated further. It is well written and fits in the scope of Biogeosciences. However before endorsing publication some revisions must be made. The introduction could be more concise and to the point of the hypothesis. I believe there is too much information at first about terpenoid biosynthesis, which if needed could be explained better in detail in the discussions relating it to the results. When you start talking about temperature as a dominant stress, one asks why you have not used temperature as a treatment, thus I

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recommend removing it (just mention it overall and go directly to the drought and ozone issue). The paragraph of the combination of stress is great, but then the biosynthetic information seems misplaced, perhaps do the same as for terpenoid biosynthesis. The objectives must be better explained and put into context in the introduction. Particularly having a paragraph above saying this was already done. Why, having Vitale et al., 2008 and Yuan et al., 2016, we need this study. Additionally, a bit of background about *Quercus robur* already in the introduction would be interesting, to support why you chose this species (more than a widely distributed isoprene emitting oak species, i.e. is this species going to suffer drought and ozone stress in particular? Why?). Methodology must be better explained. In particular a diagram choosing the number of replicates chosen for each treatment. You say you have 14 trees in total, how are they separated. For instance R4 only has two replicates for DSxOS, why?. Additionally a time series of watering and lack of watering could be expressed in this diagram as well. It is confusing what you use for emission measurements, for biochemical assays and for references. To sum up the methodology must be revised and better explained. Think that the reader must be able to reproduce your methodology. More detailed to be found below. Results and Discussion: Sometimes it looks a bit junky, as here is my results and this is its related reference. I suggest improving the whole section to make clear what have you found differently than literature or else separating results and discussion to aid this task. If you say your results relate to this and that, please expand on how they relate (using your numbers). Additionally use this chance to explain better about the implication and potential of your study (i.e. how the future modelling could change with these new results)

Line 96: where do the 2-year-old trees are coming from? Line 97: What do you mean by soil used by the city gardeners? What brand? Line 97: What brand is the quartz sand from? Line 98: how much fertilizer you put? Line 99: Tulln is a place not a brand... put the brand of the greenhouse or say how did you reach the levels mentioned. Line 100: what do you mean by close by experiment Line 101: Please state better the time of measurements. Line 101: the biochemical assays should also be

explained in the diagram. Line 104: where do you perform the drought stress, in what conditions are the plants? Line 105: I do not understand what do you mean by “maintained by keeping the soil water content at 4-5 vol%”. Wasn’t this a continuously increasing drought? Was this maintained at all SWP ranges? Then the control plants were at field capacity? Please explain better Line 106: I am really concern with plant acclimation here. As far as I understand the plants are moved ONLY 24 hours before measurements to the climate chamber. Is this enough? Please argue how is this enough. Additionally do the plants stay there or they go back to the greenhouse? I hope they stay in the climate chamber, otherwise it wouldn’t be right. Please state. Line 108: what do you mean by mid canopy height? What was the PAR level at the climate chamber? What do you mean by to adapt to constant air temp? Line 111: So DSxOS individuals are fumigated with ozone inside the enclosure while measurements were taken place or prior measurements? Please state. Line 113: why humidity was decrease and temperature increased to maintain the drought strees? Wasn’t this maintained by the SWC? Line 115: what’s is C and what is OS? Line 119: what do you mean by tree leaf gas exchange? Please state what do you mean by gas exchange and also why not this is tree emission as the branch is also inside the cuvette. Line 121: as far as I understand you maintain the tree during the seven days inside the cuvette? Do you have as many cuvettes or only 4? Please explain better Line 131: why only 370 ppm of CO<sub>2</sub>, is this realistic to nowadays? Line 145: how did you calibrate for CO<sub>2</sub> and H<sub>2</sub>O? Line 155: please state the compounds inside. Line 155: why did you have to perform calibrations so often? Line 152: do you use an average calibration factor for all compounds? Which is certainly not correct but at least what I interpret from the text. Please state how do you specifically calibrate for GLV, MESA and Sq<sub>t</sub>. Do you have them in your calibration bottle? Line 161-166: please talk about possible contributors to this mass. . . how are you sure you can only attribute those signals to the mentioned compounds? Line 193: please name and comment on the calibration of these compounds. Line 254: why high to moderate, any references? 260-263: please rephrase, I just don’t get it. 291: I wonder about the Line 303: wouldn’t it be better to

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say R4 instead of SWP -6MPa? Line 310: please can you mention on how they did not change? Line 334: actually for MT DS there was no significant increase. . . . Line 373-374: please state the values of low and high Line 404: please do not use the word believe!

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