

## ***Interactive comment on “Monoterpene chemical speciation in the Amazon tropical rainforest: variation with season, height, and time of day at the Amazon Tall Tower Observatory (ATTO)” by Ana María Yañez-Serrano et al.***

**Anonymous Referee #2**

Received and published: 14 November 2017

General comments:

The manuscript “Monoterpene chemical speciation in the Amazon tropical rainforest: variation with season, height, and time of day at the Amazon Tall Tower Observatory (ATTO)” is a suitable and in the scope of “Atmosphere Chemistry and Physics”, shading light on the importance of monoterpene characterisation. Although, the manuscript is interesting it requires a major revision as it lacks the clear structure. The reader is often forced to go forward and back. Many discussions are found in Results (e.g. L230-232, L241-242, L267-270, L276-278, L280-281 etc.). Many statements are started

C1

with not suitable paragraph context (e.g. L306: “The most abundant species are  $\alpha$ -pinene, limonene and myrcene”). Some statements and discussion are out of context or even incorrect as mentioned in the Specific comments below. It is also too long for the scientific content. I suggest the following: Restructure the text in order to join Results and Discussion into one section with adequate subsections, redo the figures as suggested below and delete the repetitions in the text. Please also find specific and technical comments.

Specific comments:

L60-63. Not entirely true. PTR-MS could have a time resolution  $<1$ s (not 30 s). It is also recently coupled with FastGC to characterise monoterpenes in  $< 2$ min. 1h GC-FID is a bit too much for “current” method. Please update the references for all this. L103 and 125 – Not indicated sampling frequency, 30 min mentioned in L125, is not in agreement with the resolution presented in the Figure 1b and c. A detailed but structured description of the methods used is needed. L106 – Air sampling section needs structure improvement. You first open with your sampler giving the reference, then you describe your sampling dates/times and then you come back to the sampler, and again back to the sampling procedure. L224 – In Table 1 it is not clear what the tolerance is. L128 – The “Instrument for chemical analysis”. Are you intent to describe the instruments or the methods used? L137 – What is “rapidly” in this context? L160 – Why just 12 and 24 if all the data are available? L164 – “ $2\sigma$  of the background” –  $3\sigma$  it is more acceptable. Also briefly describe the blanks in each sampling systems. L239 - Isoprene! Not mentions in material and methods. How is this measured? L253 – Figure not clear. E.g. isoprene 24m not visible after 12:00. Legend not descriptive, not explained what are the error bars. Some error bars below zero and yet, above LOD? Explain? L345 – “..in previous campaigns.. earlier samples were collected using a GSA SG10-2 personal pump sampler. Adsorbent tubes were filled at 167 cm<sup>3</sup> min<sup>-1</sup> (STP) air flow for 20 min”. This is again an example of poor structure. This need to be in the Material and Methods section. L380 - How the above-canopy O<sub>3</sub> concentrations used in the model

C2

and for the reactivity calculation represent real situation in the canopy (between 12 and 24m)? L439 and on – “The emission of monoterpenes has generally been thought to be from storage glands in specialized structures like resin ducts, glandular trichomes or related structures (Schürmann et al., 1993; Steinbrecher, 1989).” This generalization and discussion based further in the text are related only to conifer type or monoterpene emitters (see also in your references). Thus, this is irrelevant (and incomparable) for the tropical forest as the physiology (and chemotypes) for monoterpene emission in broadleaf tree species is different to the pool emitters. L502 and 522 – Any leaf level experiments to address this? Needs a brief discussion.

Technical corrections:

L1 – Two words “Amazon” in a title are not needed. L19 – Why just in Amazon rainforest? You may just say “a rainforest”. L24 – “automatic” - automated? L31 – “may not be the most atmospheric chemically relevant compounds”. Although it might be grammatically correct, this is a bit odd and does not read well. This is repeated later in the text. L74-76 – “scarce” – a bit over-repetition of this word throughout the manuscript and here. L230 – There is a discussion in the “Result” section. L253 – Figure 2 legend and axes text too small. L283 – Figure 3 – figure caption above not needed. Description needs to be extended. L289 – “O1D” ?! L312 – Figure 4 out of margins, figure caption not needed. Use a) b) . . . to refer to the individual figures with a clear description. Also, check all the figures to meet this standard. L381-384 - Repetition (missing meteorological information and how the i

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Interactive comment on Atmos. Chem. Phys. Discuss., <https://doi.org/10.5194/acp-2017-817>, 2017.