

## ***Interactive comment on “Six years of high-precision quasi-continuous atmospheric greenhouse gas measurements at Trainou Tower (Orléans Forest, France)” by M. Schmidt et al.***

### **Anonymous Referee #2**

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Review of ‘Six years of high-precision quasi-continuous atmospheric greenhouse gas measurements at Trainou Tower (Orléans Forest, France)’ by Schmidt et al.

The submitted manuscript presents the instrumental setup for greenhouse gas observations at a tall tower in Trainou, France. The setup in Trainou is carefully designed and nicely implemented along with an adequate calibration and quality control scheme. The presentation is clear and the technical aspects are described in sufficient detail. Thus, the paper is definitely within the scope of ‘Atmospheric Measurement Techniques’. However, a major part of the used instrumentation and also large subsets of the data are already published in the literature (see Yver et al. (2011, Tellus) for the CO and

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H<sub>2</sub> observations and Lopez et al. (2012, JGR) for the N<sub>2</sub>O observations) (both cited in the present manuscript). For example, a large portion of Table 2 (GC parameters) is identical with Table 1 of Lopez et al. This point should be more clearly made. Moreover – even if data analysis and interpretation is not the main subject of AMT – a scientific interpretation of the data is largely lacking and should be somewhat expanded, again, taking into consideration that parts of the data are already scientifically explored. Previous findings based on the H<sub>2</sub>, CO and N<sub>2</sub>O interpretation could be briefly summarized and discussed in the context of the full dataset.

The length of the so far gathered dataset is of minor importance considering the present status of the paper. Therefore, I recommend entitling the paper ‘High-precision quasi-continuous atmospheric greenhouse gas measurements at Trainou Tower (Orléans Forest, France)’.

Finally, the paper seems to be a bit hastily written. The paper might profit from a careful run-through to eliminate existing sloppiness and slips of the pen. See also my comments below.

Specific comments:

Explain all acronyms, such as FTS, CSIRO, MPI, CMSL, ANSTO, ICOS (and maybe others that I missed to list here).

Page 570, line 11: erase ‘after some initial problems’, reword that it reads ‘The ultimately achieved short-term repeatability ...’.

Page 570, line 12: revise ‘for the GC system of of 0.05 ppm’

Abstract: H<sub>2</sub> is mentioned when listing the repeatabilities but not below for the in-situ and flask comparison, the growth rates and the gradients. Why?

Page 573, first paragraph: can the emission inventories be verified with the observations?

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Page 573, line 8: I suggest to replace 'For the year 2005, ...' by 'Prior to the installation ...'. Like that, it rather indicates the motivation for the modeling study, I guess.

Page 573, second paragraph and Figure 1: I do not understand why modelled wind data are shown (for a year when no GHG observations were made) when meteorological observations should be available (according to 3.4.1). Please show real meteorological data for the years of the GHG observations in Figure 1.

Page 574, line 19: erase the comma.

Page 578, line 22: you mean '... a Parker purifier ...', right?

Page 579, lines 9-10: 'The slope of the correction function would be 0.07 ...'. Why 'would be'? 'The slope is 0.07 ...' ???

Page 581, line 1: write '... we automatically transfer ...'

Page 582, lines 6-7: didn't you produce sufficient hydrogen or was the produced hydrogen not sufficiently dry? If it was the latter, write '... not sufficiently dry hydrogen.'

Chapter 3.4.4: why are no  $^{14}\text{CO}_2$  results shown? If no reference was made to these observations later, I suggest to remove this chapter (the same holds true for 3.4.5) and to merge both into a chapter such as 'Additional measurements'.

Chapter 3.5: Add numbers for  $\text{H}_2$ .

Chapter 4.1: how were the trends calculated? Is the annual cycle subtracted first? If not, start and end of the time series for trend determinations have to be at the same time of the year, at least for species with a distinct annual cycle. Please elaborate on the procedure of trend determination.

Page 586, line 8: write '... at the 180 m level ...'.

Page 586, lines 20-21: revise sentence.

Page 586, line 26: replace 'due to soil sink' by 'due to uptake of  $\text{H}_2$  by the soil'.

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Page 586, line 27: what is this sentence doing here? How about the growth rate and the seasonal cycle for  $^{222}\text{Rn}$ ?

Page 587, lines 21-25: rephrase this sentence.

Page 589, lines 2-4: What happened after June 2012 and the some months of closing? Were the measurements resumed?

Page 589, lines 4-6: 'In 2013 the station will be upgraded by CRDS analysers ...'. Update this statement.

Page 589, line 7: remove comma.

Figure 2: what is an 'ethalon bath'?

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