

Replies to the Comments:

The authors thank the reviewers for their insightful comments. In the following, the comments are included in black while our replies are given in blue.

General comments:

The paper presents a very careful and detailed description of the annual, semiannual and quasi-biennial variations in middle-atmosphere water vapour, as observed by a large suite of satellite instruments. It is a very useful summary and should be published subject to some minor and technical corrections.

The written English is mostly very good. It has signs of being written by a non-native speaker (which is fine) but also has a few sentences which make no sense; these should be fixed. The writer has a tendency towards over-long sentences with inadequate punctuation; it would benefit from an attempt to improve the wording in these cases.

The figures are produced to a good standard and are very much improved from the pre-discussion technical review. I note that the zonal mean plots (e.g. Figure 1) appear in a wide variety of aspect ratios. In Figure 1 the plots are taller than they are wide, in Figure 5 (and much of the appendix) they are wider than they are tall, and in Figure 15 they are almost square. This makes it harder than it needs to be for the reader to compare one figure with another.

General response #1: In general this is owed to the number of panels in a figure. Figure 1 - 5, 6 - 9 and 11 - 13 use an A5 landscape format. We expect that these will be spread over the two columns in the journal version. There are differences in the width depending on the need for a y-axis label. Height-wise there are differences based on the colour bar and the legend (with a varying number of data sets). Figure 5, 10, 14 use an A5 portrait format and should only cover one column in the journal version. Figure 15 and those in the supplement use an A4 portrait. So far all figures used a 12cm width in the “includegraphics” command, except Fig 14 (which was wider unintentionally) and those in the supplement.

The typesetting of equations is not very good, especially considering that it was done with LaTeX. In particular:

- You do not need a dot for “multiply” and especially not between 2, π and t .

General response #2: We are aware that this is not necessary. It is simply a personal preference to be more explicit.

- Function names \sin , \cos , \tan , \arctan , etc. should be set in upright font. Use `\sin`, `\cos` etc. in LaTeX and `\mathrm{fnord}` for a function fnord which is too obscure for LaTeX to know about.

General response #3: No problem! We have adapted that.

- It is not made clear why a number of quantities are typeset in bold.

General response #4: It was intended to indicate an altitude and/or latitude dependence. This information is now given after the first equation in Sect. 3.1. In principle also the time t has such a dependence as the individual data sets lack coverage here and there. For simplicity we decided not to indicate that.

- It is not good style to use long words like “offset” and “linear” as subscripts. If you insist on doing it, they too should be in upright font: C_{offset} to give Coffset.

General response #5: As before this is a personal preference. The more obvious the better. All subscripts are now upright, with the exception of the indices.

Specific comments:

Comment #1: Page 2, Lines 3–4: This sentence either makes no sense or the word order is very strange.

Response #1: The sentence has been rewritten as follows: “In general differences in the temporal variation of systematic errors and in the observational sampling play a central role.”

Comment #2: Page 2 Line 12: The AMT house style is to write 0.3 W m^{-2} , not 0.3 W/m^2 .

Response #2: Changed.

Comment #3: Page 3, Line 2: Between “dehydration” and “the” strikes me as a good place to use a colon (:).

Response #3: Okay, why not? Changed.

Comment #4: Page 3, Line 21: Space should be after comma, not before it.

Response #4: Thanks! It has been corrected.

Comment #5: Page 3, Lines 23–24: This sentence is particularly oddly worded and should be re-written.

Response #5: The sentence has been rewritten as follows: “A complete understanding of water vapour changes requires also a good knowledge of short term variability, such as the annual and semi-annual variation or the variation caused by the quasi-biennial oscillation (which we denote here as QBO variation).”

Comment #6: Page 5, Line 18. The use of “Be reminded” seems odd. Maybe replace with “Note”?

Response #6: It was actually more meant as a remainder than a note. There has been a discussion before if this sentence is really necessary, if it is not obvious. At the time we decided to keep it to be on the safe side. We retain this decision now.

Comment #7: Page 8, Line 4 and Page 15, Line 21: In both cases, “likely” should be replaced with “probably”. Despite ending in “ly”, the word “likely” is an adjective (synonymous with “probable”) and should not be used as an adverb.

Response #7: Thanks for the advice. The word has been replaced.

Comment #8: Page 9 Lines 1–2: Box 2 in Figure 1 is in the middle and upper stratosphere, not the middle and lower stratosphere.

Response #8: Corrected.

Comment #9: Page 11, Line 21: “reveals” should read “is revealed”.

Response #9: Corrected.