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Annales Geophysicae Discussions

Interactive comment on "Semi-Annual Variation of Excited Hydroxyl Emission at Mid-Latitudes" *by* Mykhaylo Grygalashvyly et al.

Anonymous Referee #2

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Review of "Semi-Annual Variation of Excited Hydroxyl Emission at Mid-Latitudes" by Mykhaylo Grygalashvyly , Alexander I. Pogoreltsev, Alexey B. Andreyev, Sergei P. Smyshlyaev, and Gerd R. Sonnemann

The article presents experimental measurements of the airglow that corresponds to OHν=6*→OHν=2* transitions. The measurements taken at mid latitudes show semi-annual variation of the airglow. The authors reproduce this behavior in chemical model of MLT region. Using the model data the authors explain the behavior moreover they provide quantitative estimation of certain factors driving the airglow intensity.

The results presented are scientifically useful especially the quantitative estimations.

The article overall is solid but I have to point out that the presentation of the material

lucks some necessary details. The issues of the paper are seem to be caused by the desire of the authors to make the article shorter. The authors choose to provide numerous references instead of the detailed description. Which is of course acceptable. However some details cannot be deduced from the references so some clarification is still needed.

In my opinion the article can be published in Annales Geophysicae (ANGEO) after minor revision.

Here is the list of my complaints:

1) Experimental data set presented in the article is not fully described. Even the year of measurements is not mentioned anywhere in the article. Please add the description.

2) Part 2.2 should explain how volume emission rate is calculated from [OHν]. The reader should be devoid of guessing.

3) I believe the dynamic fields used as input data for the CTM should be explicitly characterized at least by reference.

4) Please comment on how the choice of the year in the run may affect the results.

5) The relation between (modeled) volume emission rate at peak and measured intensity should be explicitly described.

6) Please state the purpose of standard deviations on figure 1. They might deceive the reader as they look as measurement error.

7) I respect authors decision to move the formulas into appendix. (Though personally I can't agree with it as in my opinion they constitute the important part of the article.) However the A6 and A7 formulas should be placed in part 3 of the article and the notation ([O]', T', [M]') should be explained there. I also suggest the according modification of figure text (lines 628-631). Negative impact of certain factor is confusing without this.

Technical comments:

Line 86. I believe authors should mention emission rate retrieval here as well

Part 2.2 I suggest putting the description of the coefficients in (1) to the table for better readability.

Line 600. “Red” and “black” are clearly swapped here.

Figures 2 and 3. The time scale is hard to read (especially in figure 3) due to absence of space between month abbreviations.

Line 83 the representation of excited hydroxyl transitions differs from the other representations of the transition in the paper

I have to point out that I am not a native speaker so take the following suggestions with the grain of salt.

Line 167 Please add “of the peak” at the end. Line 171 “it represents the rest of the annual variation ” I suggest “it represents the part of the annual variation” Line 179 “The summer minimum at the middle latitudes is the echo of the one at high latitudes” Line 200 May be “50% of annual average” Line 232 It is not clear at that point of the article the derivation of what is to be presented. I suggest rephrasing. Line 249-250 I suggest something like “Although the accuracy of (A1) estimate is insufficient for model calculations” as simplicity of the formula in general has nothing to do with the accuracy.

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