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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Friagem Event in Central Amazon and its Influence on Micrometeorological Variables and Atmospheric Chemistry" *by* Guilherme F. Camarinha-Neto et al.

Anonymous Referee #1

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Friagem Event in Central Amazon and its InïňĆuence on Micrometeorological Variables and Atmospheric Chemistry

General comment: The manuscript presents an interesting discussion of how the entry of a cold front or cold can interfere with micrometeorological conditions and the rates of trace gas mixture in central Amazonia. The combination of surface measurements with the simulations of the coupled model JULES-CCATT-BRAMS made it possible to understand the cooling effects, as well as their development and implications. Certainly, the results related to the effects on Lake Balbina are important for understanding the effects of cold on the ecosystem as a whole. In general, the work has an important

scientific contribution, as it clearly and objectively shows the ecosystem's response to a cold event. With regard to the structure of the manuscript, it still needs adjustments in the text. Some structural modifications are needed to make it clearer to the reader around the methodological application used to achieve the proposed objectives. The only point to be reviewed more intensively is the choice of the study period and the implications of this in the discussions. As the methodology of the work itself shows, this manuscript brings as results the case study of a particular event that occurred from July 6 to 11, 2014, however, no discussion about the meteorological characteristics of this year was held, it was also not clear whether any cold front arrival in the region will cause the same effects. The authors cite other studies on coldness in the Amazon, which are in agreement with their results, but do not make clear when these analyses were performed. As much of the results are derived from simulations it would be interesting to discuss the possible annual variations or at least discuss whether such variations may exist or not, as well as answer whether the effects on atmospheric chemistry will always be these, or if by different conditions, such as a year with high burn rates, these results may diverge, that is, my suggestion is a small restructuring of the results to include these discussions.

Specific comments: About the abstract: Review the first sentence of the abstract, because it practically already brings, in a more generic way, the main conclusion of the work, that is, the authors begin the work stating that the cold event influences the variables and atmospheric chemistry. I suggest changing the sentence and leaving to make this statement at the end of the abstract along with the main conclusions of the work.

About the introduction: In paragraph 30, the authors evidence the influence of breezes on CO2 and O3 mixing rates, however, they mention a region of North America, Canada, and this is out of context in the manuscript because all other information collected in the introduction directly mentions works developed in the Amazon. If the authors want to talk more about these events around the world, they should include

supplementary discussions on the effects of lake breezes. The last sentence of paragraph 50 is a text that describes how the objectives will be achieved, that is, a text of methodology, I suggest removing or restructuring this text since this information will appear in the methodology.

About the methodology: In paragraph 70 the authors say that this is a case study, it would be interesting at this moment to talk about the specific implications of this analyzed period. When talking about the O3 measurements in the analyzed sites, it is observed that these measurements were performed at different heights, ATTO at 79m, T3 at 3.5m, T2 at 12m and T0z at 39m. Can these different heights interfere with the measurements? The authors can make a brief discussion about this.

On the results: the results are presented in a very clear and objective way, the only observation is made in relation to the period of analysis. As described in the methodology of the work, this manuscript brings as results the case study of a particular event that occurred from July 6 to 11, 2014, however, no discussion about the meteorological characteristics of this year was held, it was also not clear whether any cold front arrival in the region will cause the same effects. The authors cite other studies on coldness on Amazon, which are in agreement with their results, but do not make clear when these analyses were performed. As much of the results are derived from simulations it would be interesting to discuss the possible annual variations or at least discuss whether such variations may exist or not, as well as answer whether the effects on atmospheric chemistry will always be these, or if by different conditions, such as a year with high burn rates, these results may be different, that is, I suggest a small restructuring of the results so that these discussions are included.

About the figures presented in the results: In general, give more detailed information of the figures in the subtitles. The figures along with their subtitles have to be high-explanatory. Another detail that the authors have to review are the titles of the axes of the figures, as well as the title in the "colobar" when necessary.

On the conclusion: In paragraph 320 the authors state that in general, the model satisfactorily reproduced the main changes caused by the cold phenomenon. Did the authors intend to evaluate the application of the model? Was that a goal, too? Just one observation in the last sentence of the conclusion: it is practically the same initial sentence in the abstract, so is necessary to restructure this fragment in the abstract.

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