Review of “Impacts of Amazonia biomass burning aerosols from short-range weather forecasts” by Kolusu et al.

General comments:

This study conducted three simulations (without aerosols, with monthly aerosols climatology and with prognostic aerosol scheme) using the MetUM model to examine direct radiative impacts of biomass burning aerosols on meteorology over South America during the SAMBBA campaign. It is shown that biomass burning aerosols significantly affect the radiation budget and exert an overall cooling effect on the Earth-atmosphere system except few levels which are directly warmed by absorption of solar radiation. The paper is well written and suitable for publication in ACP. However, I have some concerns listed below which should be addressed before I can recommend this paper for publication in ACP.

Specific comments:

Page 18884, Lines 23-24: It is stated that inclusion of biomass burning aerosols in the MetUM model significantly improves the forecast of temperature and relative humidity. However, we don’t see any substantial reduction in mean bias and RMSE (Figs. 9 and 10) due to inclusion of biomass burning aerosols in the model. The bias in relative humidity even increases above 700 hPa when the model is used with a prognostic aerosol scheme. In view of this, I suggest removing this line from the abstract. Could you also please examine the statistical significance of aerosol induced changes in the meteorological parameters reported in this paper?

Page 18889, Line 15: Did you check how the distribution of aerosol other than BBA observed during SAMBBA compared with the climatology used in the MetUM model? If the observed distribution is significantly different from the climatology then it may affect the calculation of aerosol optical properties and your conclusions about aerosol-meteorology interaction.

Page 18891, Line 9-13: Can you give a reference for this statement?

Page 18892, Line 18892: Both MODIS and PROG AOD show large reduction in AOD from PD1 to PD2 (Fig. 2). Given this, how did you find that effects of BBA were similar during both the periods of SAMBBA?

Page 18892, Lines 18-19: Why are the radiative effects larger on day 2?

Page 18892, Line 28: Why do you differ from Ten Hoeve et al.?

Page 18894, Lines 16-17: I don’t see any red colors above PBL in Fig. 6a. I assume you want to say that green colors in Fig. 6a above PBL represent positive values but it is hard to understand from the color-bar whether these green colors correspond to positive or negative values. I suggest using blue colors for negative values and red colors for positive values. Could you also explain the large cooling seen at 300-400 hPa?

Page 18894, Lines 20-21: As previously mentioned, please check the statistical significance of these results.

Page 18894, Lines 26-28: Why do you see a warming at 15 km?

Page 18911, Figure 3: I would suggest using different y-axis scales for different panels. For instance, it is hard to see variations for La Paz. Medellin does not add any value to the model evaluation and thus can be removed.

Page 18915, Figure 7: Can you use a different color scale to show some variability in ice and liquid cloud water differences? Right now, it looks like that only three values are possible.

Page 18916, Figure 8: It is not clear whether white contour represent positive or negative values?

Minor comments:

Page 18887, Line 4: Change "The weakened in the Hadley circulation causing" to "weakening of the Hadley circulation caused".

Page 18887, Line 9: Change Paolo to Paulo.

Page 18887, Line 14: Add "direct" before "impact of".

Page 18889, Line 2: Can you please mention the source of chemical initial and boundary conditions?

Page 18894, Line 5: Remove one "surface".