Dear Dr. Hugo Abi Karam.

We would like to thank you for your insightful comments that enabled us to improve the quality of our manuscript. Detailed responses to your concerns are outlined below.

Referee Comment: Show each focus of heat and smoke on the map of South America during the days of the experiment, obtained from satellite imagery. One might ask what can be stated about the pollutant plume emitted from each heat source, especially around Manaus, with trajectories within the PBL. If the heat sources were many, or a focus is highlighted from the others by the intensity, what would be the axis of the dispersing smoke plume in the vicinity of Manaus? In addition, what is the concentration of transient pollutants on the area of interest? It is not enough to indicate in the text the absence of ´ heat / smoke focus in the area because a distant focus may be the source of a pollutant feather that propagates through long trajectories to the vicinity of Manaus. Could you verify this?

Author's Response: We included a map of fire outbreaks in Brazil and inside the studied grid during the simulation period in the electronic supplementary material (see Figure S2 below). In addition, we included a brief comment in the text "…that the fire outbreaks were not considered (four spots of fire occurred during the period inside the grid, although a low incidence of fire outbreaks was the criteria used for chosen the simulation period (Figure S2), which could have…" (Page 8, L298-299).

Figure S2. Map of fire outbreaks in Brazil and inside the studied grid during the simulation period.

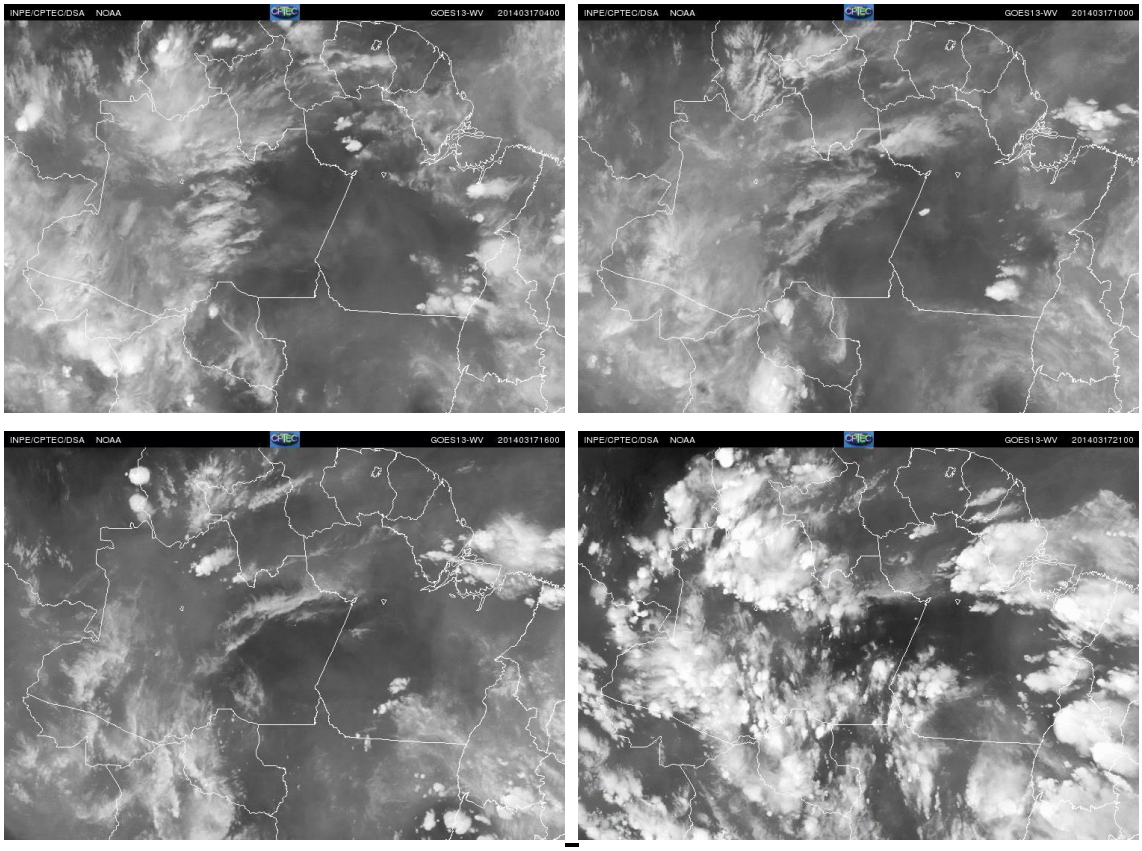
<u>Referee Comment:</u> Show if possible the spatial distribution of pollutant emission rates on the surface of the domain, graphically presenting the result of the inventory prepared and used. In addition, show corresponding two-dimensional figures. For the emission of CO_2 and other pollutants of daytime variation, present maps of the emission rate every 3 hours over the 24 hour cycle.

<u>Author's Response:</u> We understand that the inclusion of such figures would provide a good idea of how the emissions are distributed in the spatial domain. However, we decide to provide this information in a different way in the Supplementary Material and we hope it can satisfy your request in some way. We included Table S1, which contains the emissions for all locations in our grid domain. The emissions are provided in terms of mass of pollutant per year. Diurnal emissions are just considered by dividing this number by 365 and distributed following the diurnal cycle depending on the source type, as we explain in the sequence. Additionally, Figure 3 of the manuscript shows a partition of the emissions for NO_x and SO_2 for the different sources.

In relation to the diurnal cycle of the emissions, it is based on the work of Andrade et al., 2015 (Figure 7 of their work). The cycle considers the two hush ours for vehicular emissions and also the different pattern for Heavy Duty Vehicles (HDV). For fixed sources, as the thermal power plants, emissions are constant in time.

<u>Referee Comment:</u> Characterize the synoptic and mesoscale conditions present during the days of the numerical investigation. Satellite images are available? Look for the channels whose composition matches the image of air masses moving in the domain, thus doing to highlight the aerosol plumes if possible. Can this be done?

<u>Author's Response:</u> Done. We included GOES -13 water vapor images in the electronic supplementary material (see Figure S4 below).



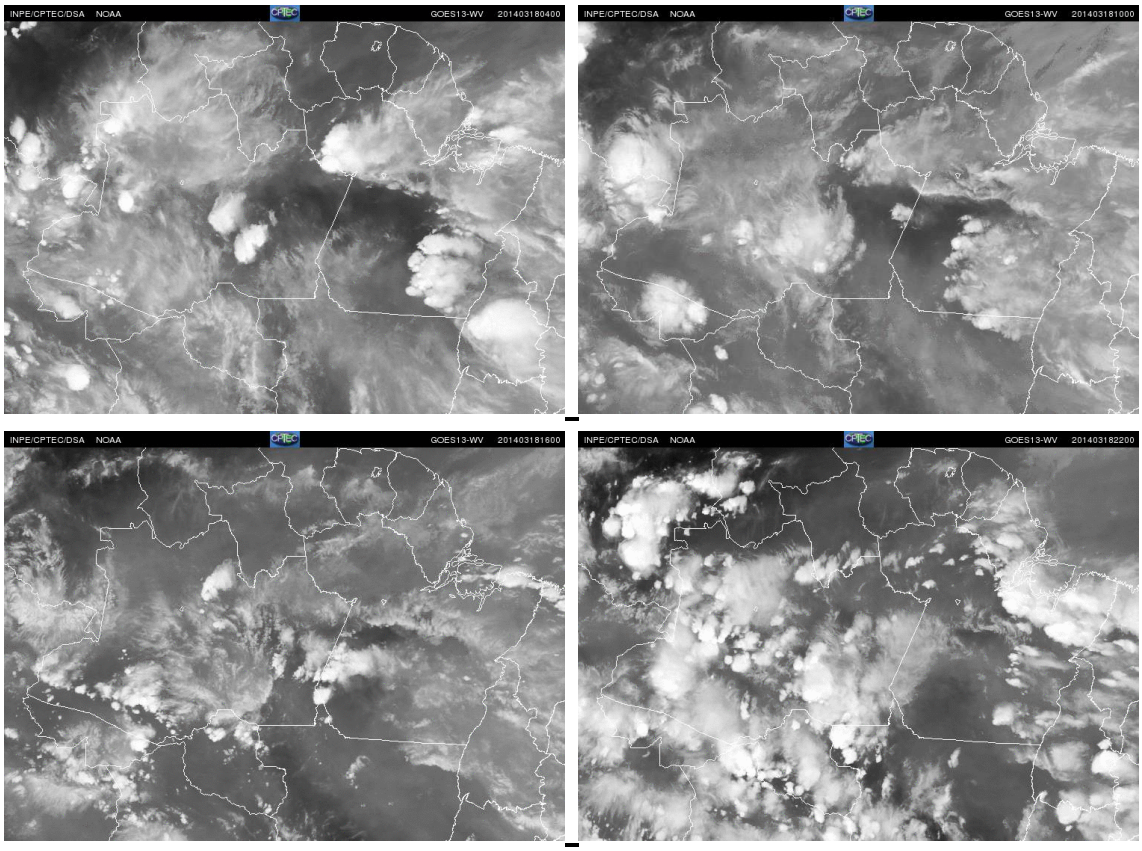


Figure S4. GOES -13 water vapor images every 6 hours starting on March 17 at 04Z.

<u>Referee Comment:</u> Spatial fields can be presented to characterize the synoptic condition: current lines and advection of equivalent potential temperature.

<u>Author's Response:</u> Done. We included spatial fields of streamlines and advection of equivalent potential temperature in 925 hPa of analysis data from the Global Model Data Assimilation System (GDAS) in the electronic supplementary material (see Figure S1 below). The following sentence was mentioned in the text "Figure S1 of the Supplementary Material shows a time evolution of streamlines and the Potential Temperature advection, where these atmospheric conditions can be seen" (Page 3, L97-99).

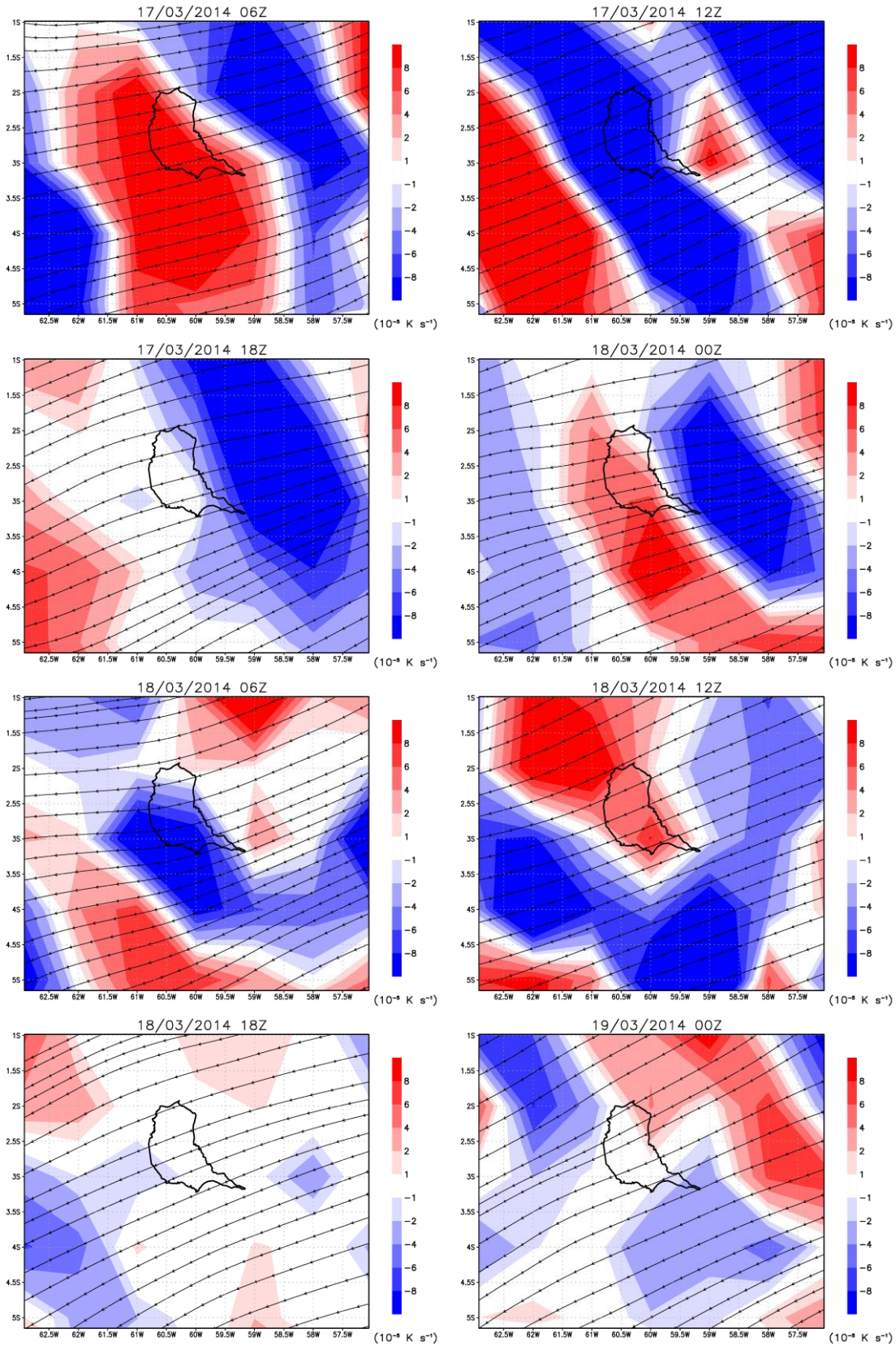


Figure S1. Spatial fields of streamlines and advection of equivalent potential temperature in 925 hPa. The black contour line shows the delimitation of the city of Manaus.