**Answer Letter**

**Title**: Classification of 2007 Winter Mist and Fog in São Paulo City

**Reviewers' comments**

Dear reviewers,

We would like to thank you for your valuable comments, they were very helpful. We have changed the manuscript according to your suggestions, as follows:

**Reviewer A:**

“The problem is significant, the methods are adequate for the problem, and the results are discussed clearly. Nevertheless, there's a lack of care for the formal way of writing an article. For instance, there is an excess of abbreviations that start in the abstract, some of them are not clearly explained, like METAR and ERA5. Others are only presented after being used several times, like LT.”

We have made a careful review and eliminated some abbreviations. The rest of them were explained in the very first time each one of them was used.

“The expression "winter cyclone" is used for post-frontal anticyclones, which is seriously misleading, since these systems occur due to synoptic-scale circulation, not the year's season.”

There was a confusion with the term in English. The term "winter cyclone" was replaced by "post-frontal anticyclone".

“It can be noticed that the geographic and topographic position can be of significant relevance for the occurrence of the phenomena. Still, there is no clear indication of where the site is, and the name of the city is not even mentioned in the abstract.”

The location is better described now in the subsection "2.1 Study Area" and the city name was also mentioned in the abstract.

“There is mention of a "plateau" and "sea breeze" in the introduction, along with a PAFOG model that is used. None of them are clearly related to the problem being studied.”

The geographical description of the EM/IAG site was better described in subsection 2.1, as well as the importance of the sea breeze circulation for São Paulo city in the introduction. “PAFOG” has also been discarded.

“Figure 1 has a very poor resolution and a confusing organization, with an orange box that adds to the confusion.”

“There is not a clear description of the surface differences between the sites where the data was obtained, since they are located in a huge urban region. Although figure 1 shows a distinction between vegetated and urban areas, and also the sea, the topography is not clear.”

We have made a new figure, with a better representation of the topography and vegetated areas.

“It is not clear why all the data was necessary since the only measured observation of fog explained in the text was at EM-IAG. The data from the airports are not considered to register fog? Do they use the same criteria?”

The fog events studied were those observed in EM/IAG. However, these observations are made only from 07 to 24 Local Time. For the first case, the Congonhas airport data (that is relatively close to EM/IAG) was considered to confirm that the fog event actually lasted during the whole night. METAR criteria were also added to section 2.2. The other data (ECMWF reanalysis and atmospheric soundings at Campo de Marte airport) were used to evaluate the synoptic and mesoscale conditions.

“There are sentences that are a literal translation from Portuguese, for instance, "He also noted that the phenomenon is also quite common in the summer months, however, it occurs less frequently."”

We have made an English review and rewritten part of the text.

“The legends of tables 1 and 2 are incomplete, all the abbreviations used in the tables should be explained in the legend.”

We have corrected them.

“Figures 3, 5, 7, and 9 have an excess of information. For instance, dew point temperature and relative humidity are indirect measurements of specific humidity, with the added issue that relative humidity also reflects the temperature.”

We agree with the comments, but prefered to keep all the information.

“It is also not clear if the ERA5 data is obtained at the same site where the EM/IAG is.”

At the end of the subsection "2.2 Data" we added the following sentence: Data from the ERA-Interim and ERA5 reanalysis were extracted from the grid point closest to the EM/IAG.

“The same color dashed line is used for the beginning and the ending time of the fog event, which is misleading in figure 3, for instance. “

We have corrected that in figures 3, 5, 7 and 9.

“Figures 4, 8, and 10 could show the wind field in greater detail. There is also a map that looks like the metropolitan area of São Paulo, but that is not explained in the legend. Moreover, the point representing the EM/IAG is a small green dot, not mentioned in the legend.”

We have explained the Metropolitan area of São Paulo limits in figure 1.

“The conclusions do not clearly express how this research contributes to improving fog forecasting, which is its main goal.”

The main goal was to classify the fog types. The synoptic and mesoscale systems associated with fog (as detailed in Table 1) contribute to fog forecasting.

Reviewer B:

 “The article uses important data to reach results, but conclusions sometimes lack proper justification.”

We have rewritten part of the manuscript and clarified the conclusions.

“The text is not fluid, with lots of abbreviations for the meteorological events, which does not motivate the reading.”

We have discarded many abbreviations and rephrased parts of the text in order to make it more fluid.

**Some comments made by reviewer B on the file, were answered below:**

“Esta frase não ficou muito clara…”

A frase foi substituída por: “... identified that the most frequent duration of the phenomenon was one hour and the longest lasted ten hours in 2007”

“Não entendi por que os eventos ocorridos durante a madrugada não foram registrados no estudo. O que Armani et al mencionaram a respeito disso?”

A frase foi substituída por: “The weather observers of EM/IAG work between 07 - 24 LT, so atmospheric phenomena - such as fog, mist, dew, types of cloud and cloud cover - that occur between 24 and 07 LT are not registered.”

“Existe alguma explicação para o último período de nevoeiro ocorrer com divergência negativa?”

Os dados do ERA5, para o dia 03 de Julho, mostram que a partir das 10 HL até o fim do dia houve convergência dos ventos na região, provavelmente devido aos ventos de noroeste, mais intensos do que no dia anterior. O nevoeiro das 18 HL se iniciou quando a velocidade do vento diminuiu, a temperatura estava decrescendo e a UR aumentando.

“Seria interessante falar um pouco sobre a participação da divergência no evento, já que está sendo apresentada esta variável nos gráficos.”

A explicação foi adicionada:

“ERA5 grid point data (Figure 3) also show wind convergence with a peak at 16 LT, indicating the SB frontal passage.”

“The ERA5 data (Figure 5) show that from 10 LT until the end of the day there was convergence of winds in the region, probably due to the northwesterly winds, more intense than the previous day.”

“E a orografia local tem alguma relação com esta conclusão?”

A frase foi substituída por: “It was also possible to notice that pre-frontal situations, with persistent winds from the NW, do not favor the formation of fog because warm dry advection takes place.”

A brisa marítima interage com a circulação de vale montanha. Nestes casos, a orografia tem um papel importante. Entretanto, não foi feito um estudo específico sobre essa interação entre circulações de meso-escala neste artigo.

“? Este termo vem do METAR? Melhor descrever aqui de forma mais clara…”

A frase foi substituída por: “On the day before the event (19), fog and mist were observed from 07 - 09 LT, the minimum temperature was 7.7 °C, with many clouds; but the maximum temperature reached 18.7 °C.”

“Deixar claro que estas conclusões se referem a esta área de estudo.”

A frase foi substituída por: “For the winter of 2007 at EM/IAG, it was concluded that…”

“Melhor dizer que “os resultados sugerem”.

Colocado: “ …, results suggest that it had the contribution of moisture advected by the sea breeze, while in the second, the source of moisture was local, from the environment around the EM/IAG.”