Reply to reviewer #1.

We greatly appreciate your comments that we have taken into account for the revision of our paper and that improved the quality of the manuscript. We are explaining below how we addressed the changes.

1. GENERAL COMMENTS: This is a very comprehensive paper on the PM2.5 and PM10 mass concentrations and metals and elemental composition for comparing two lines of the Barcelona metro system (one line that is relatively old (F-L3) and one line that is newly built with platform screen doors, driverless trains, new ventilation system, etc. (S-L9)). The SEM photographs are interesting and are usually not part of previous subway studies, which adds to a novelty of the study. The authors also present a very detailed comparative discussion between their results and previous subway studies. However, I have a number of suggestions and comments that should improve the overall quality of this paper.

REPLY: Thank you very much for your positive evaluation.

2. MAJOR SUGGESTIONS
2.1. One major part that somewhat convolutes the results of the study is the fact that the first sampling period of the S-L9 is during a time when the new ventilation system was being tested for implementation and the second sampling period was when the ventilation system was in its final summer setting, yielding PM levels that are substantially different and perplexing between the two periods. This also adds complexity to the discussion results since the ventilation system is crucial to PM levels and metal content (i.e. sometimes you compare to the first 8 days, 10 days, whole period, etc.). If the S-L9 results presented were only based on the permanent ventilation setting, this will add much more consistency and clarity to the paper.

REPLY: We agree with you that the presentation of results is complicated by the change of ventilation conditions during the study. However, we have been investigating in detail the impact of ventilation changes and recently (last month) we repeated the change of ventilation setting yielding very low PM levels again. Accordingly we think that showing this data is very important, because it makes clear the high potential for PM abatement not only of the platform screen doors system, but with the same platform screen doors changing the ventilation scheme in the tunnels. Therefore we think is important to keep the presentation for the whole campaign and also for the first 8 days, but we have adding additional information to support the high impact of the ventilation scheme on subway air quality.

2.2. Another major comment is that the paper includes 11 figures and 7 tables, some of which are excessive for this paper. I would recommend reducing the number of figures and tables and corresponding discussion in the text to increase the focus of this paper to be in line with your statement on p. 6661 line 12-15.Specifically, some of the discussion in 4.2 and 4.3 is excessively detailed and should be reduced since the information is already presented in the tables.

REPLY: We have reduced the number of figures from 11 to 9, and tables from 7 to 5, as suggested and moved them to supplementary information. We have also deleted redundant information in text from sections 4.2. and 4.3, as recommended.

2.3. All the figures and tables show average data, but no error bars or any mention of uncertainty in the text. Please include or provide a detailed explanation why this data was excluded.

REPLY: To reply this request we added standard deviation to our data in tables of measurements and chemistry. But we did not apply this to figures because the comparison with a number of places and grain sizes makes difficult adding the SD. We have instead added max, min and mean values for each site and PM size.

3. Specific suggestions/comments:
REPLY: We greatly appreciate your detailed review. We addressed all changes suggested.
3.1. On p. 6663 line 8, should it be F-L3?
> *Yes, the referee is right.*
3.2. In section 2.2, can you add the number of samples used for chemical analysis?
> *Added*
3.3. On p. 6665, there is no "top" or "bottom" figure. Please correct.
> *Corrected, we apologize for the mistake.*
3.4. Please rephrase p. 6668 line 19-23.
> *Done.*
3.5. On p.6669 line 26-27 is not validated based on your discussion and contradicts the previous sentence as well.
> *We agree this is a bite confusing and have deleted the sentence.*
3.6. On p. 6671 line 25, should it be 14-22%?
> *Yes, changed.*
3.7. On p. 6672 line 7-8, you state there is an anticorrelation and a correlation between x and y, what are the correlation coefficients?
> *We have added the values for the correlation coefficients.*
3.8. Please change 'very probably' to 'probably'.
> *Done.*
3.9. On p. 6672, line 29, should it be 5.1 ug/m3?
> *Corrected, we apologize for the mistake.*
3.10. On p. 6673, line 18-19, should it be 1.5-1.6 ug/m3?
> *Changed*
3.11. Are REEs "rare earth elements"? Which elements were included?
> *Yes, they are Rare Earth Elements and included from La to Lu. Added to the text.*
3.12 . On p. 6676 line 2, are the PM10 levels at platforms deduced from the PM2.5/PM10 from Table 3? If so, please correct as your ratios most likely do not correspond to other
subway systems.
> *We supposed levels were in the range of PM10 from the high or low PM2.5 levels, when only one fraction was measured. We did not apply any factor, but to avoid confusion we deleted from the text the cases where PM10 or PM2.5 were deduced from the other fraction.*
3.13. Similar comment for p. 6678 line 7 regarding the PM10 levels inside trains. Are they deduced from Table 4? If you are deducing based on your own data, these PM

levels are most likely invalid as ventilation systems in trains vary substantially. For line 13, why are the PM2.5 levels 'probably' for Prague and Berlin?

>*As for q 3.12, we supposed levels were in the range of PM10 from the high or low PM2.5 levels, when only one fraction was measured. We did not apply any factor, but to avoid confusion we deleted from the text the cases where PM10 or PM2.5 were deduced from the other fraction.*

3.14. On p. 6679 line 20-23, please rephrase.

>*This has been rephrased.*

3.15. On p. 6680 line 6, should be Fig. 11.

>*Yes, it has been changed to Fig. 9 now.*

3.16. Was PCA also attempted for each separate rail line? Any differences?

>*We did not attempt PCA for each line separately as the number of samples was then too small for definitive results. We agree a longer campaign with larger number of samples could show chemical differences between the 2 metro lines.*

3.17. Are there any nearby ambient PM monitoring stations of PM2.5 and PM10 mass concentrations for making concurrent comparisons to ambient air?

>*No, there is not any AQ monitoring site nearby the stations. However, we used data from an urban background monitoring to correlate variations with platform PM levels. The results were that correlation does not exist as expected of the high levels on the platform compared with outdoor. We did not include this in the paper.*

3.18. For Table 1, what is the difference between platform, platform end, and sampling site? Are they necessary? It is also interesting to note that most of PM2.5 is PM1 (same with Table 4), but most of PM10 is coarse PM.

>*Platform means average for different measurements done along the platform, whereas platform end and sampling site are equivalent and refer to the actual place where filter sampling was done. Thus, we have modified table 1 making the site description clearer.*

3.19. For Table 2 and 3, please label the second set of columns instead of italicize.

>*We have modified it.*

3.20. For Table 5, is it necessary to present two periods for the Sagrera line for PM10?

>*We consider it is important to show both columns as ventilation was so important in altering PM levels.*

3.21. For Fig. 9, what are the PM size fractions of these SEM photos? Are there any differences between the PM fractions?

>*SEM images were taken from the PM10 samples for both stations. We did not observe obvious chemical differences between particle sizes as >90% of particles were hematites. We did see that particles coming from melting processes and from brake abrasion were generally smaller in size <5µm), this is mentioned in figure 7 caption.*

3.22. Finally, please proofread as there are numerous grammar and punctuation errors.

>*We apologize for all grammar errors in the original version and have accordingly corrected the text.*