

# ***Interactive comment on “Chemical characterization and source apportionment of submicron aerosols measured in Senegal during the 2015 SHADOW campaign” by Laura-Hélène Rivellini et al.***

## **Anonymous Referee #1**

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Manuscript is a well-written and organized and it offers important information about the aerosols and their sources in West-Africa, Senegal. I recommend it for publishing in ACP after addressing some comments below.

1. Aerosol acidity approach (Chapter 3.1.3, equation 11?) is valid if the influence of metal ions, as well as organic acids and bases on  $\text{NH}_4^+$  concentration is negligible (Zhang et al., 2007). When the sulfate to  $\text{NH}_4^+$  ratio is high, the amount of atmospheric ammonium is not sufficient to neutralize all  $\text{SO}_4^{2-}$ ,  $\text{NO}_3^-$  and  $\text{Cl}^-$  anions. In such a case at least a fraction of  $\text{NO}_3^-$  and  $\text{Cl}^-$  anions must be associated with cations other

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than  $\text{NH}_4^+$  and Eq. (11) is no longer valid. This should be discussed and clarified in the revised manuscript.

2. Recently, it has been demonstrated that some inorganic salts (e.g.  $(\text{NH}_4)_2\text{SO}_4$ ) have a positive bias on the  $\text{CO}_2^+$ -signal through reaction on the aerosol mass spectrometer vaporizer (Pieber et al., 2016). This interference is highly variable between instruments and with measurement history. How big is this interference value for your ACSM and possible impacts on data analyses including PMF.

3. How can authors explain high  $\text{NO}_3^-$ -concentrations in air masses from South-West? The air mass history can be investigated e.g. using backtrajectories calculated with the HYbrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT).

4. What are the following steps for aerosol research in this region of the world? Are these results valuable for policy makers to guide cleanup and decision making for future industry? Please, improve discussion.

#### References

Pieber, S. M., El Haddad, I., Slowik, J. G., Canagaratna, M. R., Jayne, J. T., Platt, S. M., Bozzetti, C., Daellenbach, K. R., Fröhlich, R., Vlachou, A., Klein, F., Dommen, J., Miljevic, B., Jimenez, J. L., Worsnop, D. R., Baltensperger, U., Prévôt, A. S. H. Inorganic Salt Interference on  $\text{CO}_2^+$  in Aerodyne AMS and ACSM Organic Aerosol Composition Studies. *Environmental Science and Technology* 50, 10494-10503, 2016.

Zhang, Q., Jimenez, J. L., Worsnop, D. R., and Canagaratna, M.: A case study of urban particle acidity and its influence on secondary organic aerosol, *Environ. Sci. Technol.*, 41, 3213–3219, 2007.

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