

Interactive  
Comment

## ***Interactive comment on “Vertical profiles of urban aerosol complex refractive index in the frame of ESQUIF airborne measurements” by J.-C. Raut and P. Chazette***

### **Anonymous Referee #1**

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In this manuscript aerosol properties are presented from measurements taken in a field program near Paris in July 2000. The focus is on the vertical profile of the refractive index although other properties are also shown. The vertical profiles with back trajectories allow conclusions to be drawn about the aerosol source and mixing characteristics. The paper is well written and organized. The authors covered the important measurement issues and error sources and did an excellent job at synthesizing the observations. The field measurements which include a lidar, sun photometer and in-situ measurements complement each other and result in the very nice overview of the PBL aerosols, although for a rather limited region and time frame. I would not say that the conclusions are particular unique or novel but the experiments were very well de-

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signed and I believe it represents an important measurement suite that should gain a larger audience. Therefore I recommend the manuscript be published after the authors address a couple of minor comments which follows.

1. Did the authors conduct a sensitivity study of the back trajectories from Hysplit? This can be done by considering a volume of end points and tracing back perhaps up to about a hundred trajectories to demonstrate a lack of sensitivity on the precise location of the end point. Also back trajectories in the PBL are suspect due to the effects of turbulent mixing and large scale eddies.
2. How rapid is the convergence in the iterative process to retrieve the ACRI? Is uniqueness guaranteed?
3. Why is it not possible to retrieve the refractive index separately for the accumulation (fine) and coarse modes?
4. What errors are introduced by assuming the aerosols are internally mixed?
5. In Equation (1) it is assumed that epsilon is constant. Shouldn't epsilon be different for the accumulation and coarse modes?
6. Page 10809, Line 14. The sentence: "Aerosols are only a few  $\check{E}$ .." is not grammatically correct. Please reword.
7. It would be useful to compare the aerosol size distributions from PCASP and AERONET. Can this be included?

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