Major comments

Droplets generated by means of piezo-elements might be charged, giving rise to electro-scavenging forces which can affect the collection rate: see, for example, Pranesha et al. (1966) and Ardon-Dryer et al. (2015). In addition, the aerosol neutralizer leads to a Boltzmann distribution where the most common charge state other than neutral is a single charge. Therefore electro-scavenging forces, due to spurious charges, cannot be ruled out unless drop charges are measured. In addition, the droplets are falling in a subsaturated environment (77% RH) and could therefore evaporates giving rise to phoretic forces.

The authors should clarify these important aspects in order to highlight their results.

Line 73. " *The Slinn model (1977) does not reproduce this increase efficiency, leading to errors of several order of magnitude...*". Lai et al (1978) measured scavenging of aerosol particles by falling water droplets. They compared their results against Beard and Slinn models. Concerning the Beard model the authors stated that "*... his estimation of the collection efficiency is more than one order of magnitude lower than our experimental results...*" and concerning Slinn model *"...hardly predicts the qualitative features of our results, it intercepts the range of values obtained in this work with submillimeter droplets ...*". Therefore Lai et al. (1978) concluded that the Slinn model at least intercepts their experimental data. The authors should explain this different conclusion.

Line 164 *"...the Slinn model underestimates by two order of magnitude the measured collection efficiency for submicron-sized particles*". The figure below shows, among others, the collection efficiency from Lai et al (1978), present manuscript, Beard (1974) and Slinn (1971), Quérel et al., (2014). The collection efficiencies are given as particle aerodynamic diameter. It can be seen that the experimental points from the present manuscript are in agreement with Beard (for D < 1 micron); however the collection efficiency from from Slinn model (taken from Fig. 6 of Lai et al. paper) is in better agreement with Lai and not with the manuscript authors (see previous comment).

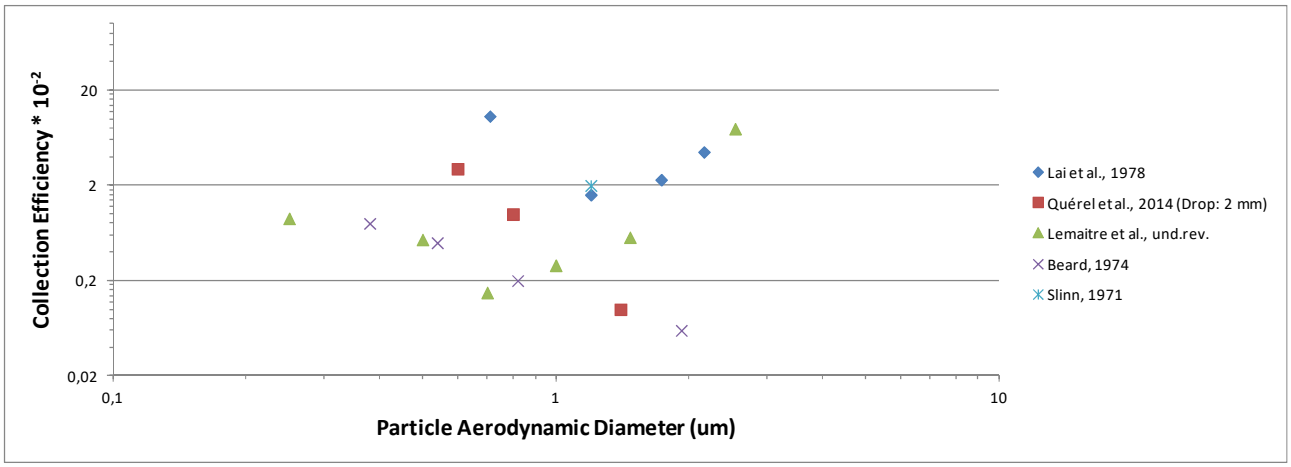

Figure 1

The experimental points from Lai et al., were obtained with AgCl with a particle density of 5.6 g cm^{-3}, larger than the particle density used in the manuscript (1.3 g cm^{-3}).

Droplet rear particle capture is mainly due to inertial effects (Brownian diffusion is too weak in this particle size range) therefore, in order to compare results from different papers, the collection efficiency should be compared against aerodynamic particle diameter or even better against the Stokes number.

Line 478. "*The reasons for the increase in collection efficiency for particles smaller than 0.65 µm in diameter are not as easy*". This sentence is badly written since all scavenging models predict an increase in collection efficiency for submicronic aerosol particles due to Brownian and turbulent diffusion processes (among others Davenport and Peters 1978, Park et al., 2005). The authors should clarify that they are considering a limited size range where Brownian diffusion is not important.

Table 1. Since the input aerosol is not monodisperse, it is not clear how the authors report the collection efficiency for the particle sizes given in the table.

Table 1. $U_{R,E}$ is the relative measurement uncertainty which is mainly due to the contribution of fluorescein uncertainty inside the aerosol chamber (0.08). The propagation of variances equation (line 612) gives about 0.17. Table 1 (first raw) gives 4.5 10^{-4} as the $U_{R,E}$ value. If it is the absolute uncertainty, then E times $U_{R,E}$ (8.8 10^{-3} times 0.17) gives 1.5 10^{-3} not 4.5 10^{-4} as reported. The authors should explain better the data shown in Table 1.

Minor comments

Line 30. *Beard (1974).* In the reference list there are two papers from Beard (1974).
Line 107. Mircea et al. is not in the references list.
The reference list is not typographically uniform.
Line 424. M_{drop} becomes M_{gtte} in equation 6 and so on.
The English language of the manuscript should be revised.

References

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