

Interactive comment on “Experimental investigation of turbulent particle radial transport processes in DWDS using optical tomography” by R. Floris and P. van Thienen

Anonymous Referee #2

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Review:

“Experimental investigation of turbulent particle radial transport processes in DWDS using optical tomography”,

by R. Floris and P. van Thienen

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General Description This paper analyzes the deposition behavior of dilute suspensions in water with reference to the application to Drinking Water Transport Systems.

Authors perform a number of experiments in a (rather limited) range of parameters to identify a phenomenological relation between the general transport pattern of particles and their deposition behavior.

They conduct experiments in a cylindrical transparent pipe and use an optical tomography technique.

Their results are not compared to other sources of data and are reconciled with the physics by a qualitative examination of previous theoretical/computational/experimental results from the literature. Authors justify the primitive nature of their comparison by the current lack of experimental findings in water solid systems.

The object of the paper is rather ambitious *The objective of the research reported here is to study the flow conditions and particle size for which either gravitational settling, turbulent diffusion or turbophoresis dominate radial particle transport and to verify qualitatively and quantitatively the modelling 15 approach proposed by van Thienen et al. (2011a), an application of the turbulent particle deposition theory of Young and Leeming (1997) and Guha (1997, 2008) to DWDS that includes additional effects and forces relevant for drinking water distribution systems.*

Opinion The manuscript is an addendum to the previous paper of the same Authors (van Thienen et al., 2011a). The only original result is reported in Figure 5, where the concentration transport patterns are presented. Figure 6 is a summary of the experiments performed.

Currently the paper is a promise which should be maintained. The Authors have a running facility and an original investigation method. They have just tested the capabilities of the experimental tools. Carefully planned experiments and attentively organized results are still to be found and presented.

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In my opinion the work is still too preliminary for a Journal publication and more work should be done to adjust the paper to the object. In addition, there are a few comments which Authors should perhaps consider.

Comments

1. Turbophoresis is probably less important here since particles considered (coffee powder) is rather small;
2. Particle relaxation time is here defined including the added mass. This is correct for high density environments, but the reader should be reminded (as in van Thienen et. al, 2011a);
3. I was not able to find dimensionless relaxation times for particles. If the deposition velocity is sought, then results should be presented with reference to the plot in Figure 4. The reader should be able to identify on which deposition regime Authors are focusing;
4. Particles deposit probably due to the lift force here; an estimate of the various forces approaching the wall should be made.