Drink. Water Eng. Sci. Discuss.,
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Drinking Water
Engineering and Science
Discussions

Interactive comment on "Can terminal settling velocity and drag of natural particles in water ever be predicted accurately?" *by* Onno J. I. Kramer et al.

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Referee #1 (14 November 2020) rebuttal

âŰž Kramer, O.J.I., de Moel, P.J., Raaghav, S.K.R., Baars, E.T., van Vugt, W.H., Breugem, W.-P., Padding, J.T., and van der Hoek, J.P., Can terminal settling velocity and drag of natural particles in water ever be predicted accurately?, Drinking Water Engineering Science Journal, Discussion, https://doi.org/10.5194/dwes-2020-30, under review, 2020

This paper is a very detailed discussion of the spread of 3,629 terminal settling ex-

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periments and of related literature data. Scientific sustained arguments leads to the conclusion that new advanced research is needed to improve the prediction accuracy for settling velocity, drag coefficient and terminal Reynolds number of non-spherical particles such as drinking water related particles. The quality of the paper has to be upgraded by the following minor revisions:

Dear reviewer, On behalf of all authors, may I thank you very for your willingness to assess this article. The comments were highly useful and have helped to improve the article. In this rebuttal, all comments are addressed (in green). Kind regards, Onno Kramer

- Line 87: according to: : :. Replace Newton by Clift. Adjusted.

- Line 116: add: Nian-Sheng Cheng 1997 Terfous et al. 2013. Goossens 2020. Added to reference list. Note: Goossens: year is 2019 according to Powder Technology.

- Line 190-191: ""standard drag curve", ADD (Lapple-Shepherd 1940) Added tot reference list.

- Line 290: this definition of the Galileo number has to be repeated in the list of symbols. comment: this definition is peculiar as in a standard way the square root is omitted. Nomenclature updated with the dimensionless numbers e.g.: Ga=$\sqrt{}$Ar=$\sqrt{}$(gãĂŰd_pãĂů^3 _f |_p-_f |/η^2) etc. The Galileo number without the root is the Archimedes number Ar. In general, both can be used. The main reason to use Ga is that the regime map by (Jenny et al., 2004) and the one of (Zhou and Dušek, 2004) used as an important reference in the present work (Fig. 10 in the main article) uses Ga and not Ar. Furthermore, most of the literature reporting the regime maps pertaining to the instabilities of falling/rising spheres use Ga and not Ar (see for e.g. Jenny et al., 2004, Zhou and Dušek, 2004, Veldhuis and Biesheuvel, 2007). Hence, in the regime map they report (x-axis) as Ga. So, we were consistent with them.

Added to the article: Note: The majority of literature which addresses path instabilities

use the Galileo number based on the regime map (Jenny et al., 2004), and not the Archimedes number (Karamanev, 1996).

- Line 325: replace “estimated” by “experimental”. Adjusted.

- List of symbols: are not used in the paper and have to be removed of the list: A,b,c, Ar As ct di dp dsi Eh50 E1.50 Ew50 Fb Fd Fg Fp k Symm UC x Greek: likewise: : :.. Redundant symbols removed. Note: these symbols were used in the Supplementary Material.

- List of symbols: Are to be defined: Cd =definition of eq. (4) Cd’ _ Cd dp is volume-equivalent particle diameter Ga = definition of eq. (5) Ret = definition of eq. (2) Adjusted: equations added.

- References: ADD: Nian-Sheng Cheng, J. Hydraulic Eng. February 1997,149-152 Walter R.A. Goossens, Powder Technology 362 (2020) 54-56. C. E. Lapple and C. B. Shepherd, Ind. Eng. Chem. 32(5) (1940) 605-617. A. Terfous, A. Hazzab, A. Ghenaim, Powder Technol. 239 (2013) 12-20. Added tot reference list.

In addition: the following textual changes has been made in:

DWES Kramer 2020 Article - Manuscript.docx - fig 12 green was lost after making a PDF - pellet softening -> pellet-softening - Fractionated ipv fractionised - reuse -> re-use - Camp, 1852 -> 1946

DWES Kramer 2020 Article - Supplementary materials.docx - experimental set-up: wrong (Haynes) ref. removed

Interactive comment on Drink. Water Eng. Sci. Discuss., https://doi.org/10.5194/dwes-2020-

Please also note the supplement to this comment:
https://dwes.copernicus.org/preprints/dwes-2020-30/dwes-2020-30-AC1-supplement.pdf

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