Anonymous Referee #1
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General comments
This paper presents a 3D two-phase flow numerical model for sediment transport (SedFoam-2.0) in detail, including the mathematical formulation and the numerical implementations. The authors newly include the mixing length turbulence model, the kω model, and dense granular flow rheology into SedFoam. The main purpose is to provide a comprehensive numerical framework that solves the two-phase flow equations in three dimensions with the capability to select different combinations of turbulent model and granular stress model for sediment transport. This paper is well written and pleasant to read. The reviewer suggests acceptance after minor revisions.

Specific comments

Page 5: The authors state that h_{Exp} depends on the particulate Reynolds number. Its default value is 2.65 in SedFoam-2.0. To avoid misuse by users, it should be mentioned the range of the particulate Reynolds number in which h_{Exp}= 2.65 is applicable.

This parametrization is not supposed to be very sensitive, according to Di Felice (1994) the value of hExp depends and the particulate Reynolds number. For particulate Reynolds number between 1 and 300, which is mostly the case for sediment transport applications, the value of hExp varies between 2 and 2.65. The following paragraph has been added to the manuscript between l. 11 and l. 16 p. 6:

"The hindrance function $\beta^{-h_{Exp}}$ represents the drag increase when the particle volume concentration increases. h_{Exp} is the hindrance exponent that depends on the particulate Reynolds number \cite{difelice1994}. For simplicity, the value of h_{Exp} is assumed to be constant (default value is 2.65), and its value can be specified from the \textit{constant/transportProperties} file in \sedFoam. This hypothesis is valid for particulate Reynolds numbers lower than unity or larger than 300, within this range the exponent value decreases down to $h_{Exp}\approx2$."

Page 14: Is the value of B_{phi} in Eq. (46) 1/3 as that in Eq. (43)?

There was a mistake in the manuscript about this value which is now corrected, the value of Bphi for the viscous regime of the granular rheology is 1 Eq. (43) and between 0.31 and 2/3 for the grain inertia regime Eq. (46). This has now been corrected in the manuscript.

Page 23, Figure 2: Lee et al. (2016) mentioned that SedFoam might yield fluctuating particle pressure. From Fig. 2, SedFoam-2.0 seems improve this weakness. How does sedFoam-2.0 improve this weakness?

Following the idea suggested by Lee et al. (2016) we have used the fixedFluxPressure boundary condition for the pressure at the bed. We have added the citation to Lee et al. (2016) and we apologize for not having cited this paper in the first version.

Technical corrections
Page 11, Line 8: Double "are."
Page 24, Line 12: Change " 210^{-4}" to "2×10^{-4}"

Typos have been corrected.

Reference
Lee C-H, Low YM, Chiew Y-M. Multi-dimensional rheology-based two-phase model for sediment transport and applications to sheet flow and pipeline scour. Phys Fluids 2016;28:53305. doi:10.1063/1.4948987.