

General comments:

The presented numerical study titled '*sedInterFoam 1.0: a three-phase numerical model for sediment transport applications with free surfaces*' examines four simulations while comparing the performance of the updated *sedInterFoam*, modified after *sedFoam*, *interFoam*, and *waves2Foam*, in simulating three-phase flows, and eventually targeting sediment transport modeling under coastal environments. The work is appreciable and the manuscript is written quite well. I hope the following comments and suggestions are helpful in improving the manuscript:

Specific comments:

1. I miss a grid sensitivity test and the effect of turbulence model, which could improve the obtained results, e.g., the disagreements discussed in lines 246-248.
2. Fig. 2: compare the volume fraction contour plot and air/water interphase separately.
3. The interfaces shown in Fig. 4(a) correspond to what exact phi values?
4. Fig. 4: please discuss about the discrepancies observed at y around 0.05 m for $t = 652$ s and later.
5. Why separate limiting CFL were used in different cases. What was the basis behind the selected values? Please discuss.
6. Line 247: please also plot the *sedWaveFoam* results in Fig. 8.
7. Line 253: 0.4 m deep flume or the flow depth is 0.4 m?
8. Fig. 8: stretch the top panel of Fig. 8 vertically. Show error bars and discuss about % errors in the simulated results. Also, place the locations of the profiles in Fig. 8 (bottom panels) in Fig. 7 for a better understanding. Define y .
9. Fig. 10: why phi is up to 1.0 since phi of sediment is 0.61. Also, what are the phi values of the interfaces?
10. Fig. 10: were there no experimental data to compare the results? Zoom into the areas of erosion, deposition etc. for a better visibility and understanding of the findings discussed in lines 265-264.
11. Fig. 11: wave profiles in Fig. 11 are significantly lower than the water surface profiles provided in Fig. 10. Please cross check. Use m in y axis too.

Technical corrections:

1. 'modeling' in place of 'modelling'. Please follow either US English or UK English, do not mix.

2. Which version of OpenFOAM the code modifications are based on? Please mention in the manuscript.
3. Please provide the full form of 1DV.
4. Use 'Fig. 4(a)' in place of 'panel (a) of figure 4'. Follow the same at other locations throughout the manuscript.
5. Line 240: use 'compared with' in place of 'compared to'.
6. Details of the solitary wave characteristics are missing.
7. Section 4.4, Fig. 9: mention the depth of the sand layer.
8. Fig. 7: what is z in Fig. 7. Should it be y ?
9. Please mention whether the simulations were run in parallel. How many cores were used and what were the simulation execution/run time.
10. Line 265: please recheck if 'sediment accretes' fits here.
11. Line 267, Fig. 11: 4.87 m and 5.85 m results are missing in Fig. 11.
12. Lines 275-276: 'Following the laboratory experiment, each successive solitary wave is sent after the previous solitary wave impact to the flow field and bathymetry diminishes' – provide time intervals between the successive waves.
13. Provide % errors correspond to the highest deposition and deeper scouring points in Fig. 12.
14. LES not tested in the study but mentioned many times. In the future, do you plan to extend this study using LES?