The paper presents a Lagrangian method to model the transport of no-mass particles, implemented in the SERGHEI framework. The introduction is easy to read and comprehensive, with up-to-date references. The algorithm is discretized with three different approaches, which are systematically tested to assess the computational cost and overall efficiency. The contribution is very interesting, well-structured and carefully organized.

As the "passive particles" are not clearly identified (they could be microplastics, seeds, pollutants…) the fact that the model only includes transport is fine, although further enhancement would be required to model specific dynamics (like deposition, sedimentation, entrapment) that depends upon specific particle types. This lack of specificity is totally fine but could be discussed in conclusions to better contextualize the potentialities of the proposed model.

My main concern is about a restriction included in the model, to avoid particles reaching a dry cell because of turbulence. This is fine, in general, but may prevent natural behavior of particles that can actually reach dry cells, if I well understood the implemented approach. This should be discussed in more detail, as stated in the specific comments.

Please, find below my specific comments and a few typos to be corrected.

Specific comments

Line 44: "are designed for coastal scenarios where challenging wet-dry transitions do not occur". This sentence appears counterintuitive. Generally, on the coast, waves give rise to wet-dry scenarios. Please, specify what you mean.

System of equations 9: Please specify that the system of equations (9) represents the discretization of the system of equations (6). Additionally, you could explicitly describe the connection between $\mathbf{v}_{disp}$ in system (6) and the random-walk model in system (9).

Lines 188-190: The time step of the particle is not necessarily an exact divisor of the hydrodynamic time step, as shown also in Figure 2b. In Eq. (15), the particle time step is different from the one computed by Eq. (14)? If so, how is the index "m" imposed? And, please check Eq. (15) versus Eq. (16), because they seem inconsistent (if Eq. (15) is correct, the summation of the particle time step is equal to the hydrodynamic time step, so the hydrodynamic time step minus the summation should be equal to zero in Eq. 16).

Lines 227-228: This restriction appears quite strict. It appears to limit the effect of turbulence. Are the effect of such limitation discussed? Are the Authors planning to remove it in a later version of the code? Furthermore, is it possible for transported objects that reach a dry cell to stop there?

Figure 4: The logical connection between modules is not fully clear. The figure shows a "Lagrangian particle transport" module (LPT), while in the text it is referred to as "Lagrangian model". Using the same term in the text and in the figure would help the reader, also in Fig. 5. Finally, what do the Authors mean with "Lagrangian model for distributed computations" (lines 249-250)?

Figure 6 is not clear: are all the three errors normalized by the Euler error? Apparently not (the Euler error should be one), and this is in contrast with both the vertical axis in the figure and the figure caption. The strong dependency on the domain discretization is not clear, either. It appears clear from the MAE and RMSE written in the figures, but not for the graphs. Please, consider to modify this figure.

Figure 8: please consider changing the particles color or zooming in the image to make the particles more visible.

Caption of Figure 10: 10000 particles are reported. This appears in contrast with line 309, where it is written that the simulation was performed with 1000000. Please, check.

Line 344: Can the Authors clarify what they mean by “areas of stagnant transport”?

Line 348-349: Can the Authors clarify what they mean by “the higher frequency of particles compared to the event 2”?

Conclusions: Nothing is said about model’s future developments. Are the Authors planning to include a strategy to account for particles deposition? This also depends on the type of particles that they are aiming to model (plastics, seeds…). The work would possibly benefit from a more critical analysis of the potential applications of the model.

Typos

Line 175: I guess there is a typo, as “respectively” is repeated twice.

Caption of Figure 3: “final position” seems unnecessary.

Line 266: It should be “L_1 norm”, and not “L_1 Norm”. The same for L_2 norm at line 270.

Line 283: “described” semms unnecessary.

Line 284: “modying” should be “modifying”?

Line 300: another way of presenting the *L* norm is used. Please be consistent in the terminology (choose between *L* Norm, *L* norm or *L*-norm).

Line 332: “This” and not “these figure”.

Line 339: Please, use the same term, “travelled distance” or “covered distance” for higher consistency.

Line 347: “the difference between the events is higher”