Response to comment

RC2: 'Comment on egusphere-2025-6170', Anonymous Referee #2, 17 Mar 2026

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This manuscripts describes the results of an initial experiment that analyzed Stokes drifter's trajectories in the Dutch Wadden Sea, mostly affected by the tidal cycle and wind conditions. It sets a new methodology to automatize the analysis of GPS data in order to determine whether the drifter was moving floating on the water or stopped on the ground (mudflats, beach, etc.).

While the methodology is robust, the Stokes drifters used (1 kg - circular flat shape) may behave quite differently from many of the most common items found floating at sea in shape and floatability, which can be predominantly film type plastic fragments of only a few grams that are inmersed in the upper layer and not exposed to windage, or highly protuding and exposed to windage items like bottles or foam like polymer, again lower weight and different behaviour to wind. This brings the further question of how can different litter items respond to grounding events on the mudflat, given the different shapes and densities (or floatability) compared to the drifter's, could some get stuck (like glued). This is only discussed very briefly.

We thank the reviewer for their compliments on our robust method and agree with the reviewers point that the variety of plastic pieces and their floating behavior can be expected to have an impact on the grounding processes, and in particular that the Stokes drifters sample one specific instance of grounding processes. Accordingly, the discussion is now extended in L313f :

In contrast, marine macroplastics have widely varying shapes, weights and air-to-water drag ratios, which impacts their dynamical behavior.

Another issue is the lack of discussion on the nature of the groundings (or beaching), since other substrates than mudflats may have a high capacity to trap plastics, like vegetated saltmarshes.

Figure 4 now includes a table to characterize the nature of the events as mentioned here. We find that there are very few transitions in regions where vegetation is present, however, there are many instances where they occur close by or potentially under direct interaction with human-made structures. We decided not to dive deep into separating and characterizing the individual or groups of deployments/trajectories. This involves dedicated efforts that are beyond the scope of this article.

In general, the discussion of results is very limited. For example, on how could be defined the awaited specific parameter considering beaching that modelers could use to improve global plastic transport models.

We now specifically mention plastic modeling in L308 of the conclusions. Our intention is that we summarize in the conclusion section the factors (tides or more generally water level,

wind, duration of the grounded/floating section, complex local topography) that e.g. a modeler can take as input to formulate a grounding model.

Please find some minor questions/suggestions in the commented PDF file.

We refer and respond to the comments in the PDF file below here:

Table 1.

After reflecting on comments by both reviewers on the definitions of ‘wetting’, ‘drying’ and ‘beaching’, we changed the categorization of events into ‘groundings’ and ‘resuspensions’ only. We describe this adapted categorization in Table 1. The terms ‘grounding’ and ‘resuspension’ are more focused on the state of the drifters, and we distinguish the last/first transitions of a recording by focusing on what we know about the duration of the corresponding last/first sections. This changes how the events are integrated in the statistics that we use to characterize the transitions.

Figure 1.

We extended the caption of now Figure 2. to clarify the meaning of the times above the grounding/wetting lines:

The vertical green and blue lines mark grounding and resuspension events, respectively, and the times above these lines indicate the duration of the sections.

Line 147

We discuss the inaccuracies of GNSS systems for our application in Appendix C, where we now add a short sentence in L367 to explain how we determine the value for the Stokes Drifters at rest:

For the analysis here, we determine σ_{gnss} *from the trajectory of a drifter at rest*.

We did not investigate differences in accuracy between a mobile and immobile drifter.

Line 165

The reviewer is highlighting a crucial typo, the inequality should indeed be the other way around.