Review of „Modelling floating riverine litter in the south-eastern Bay of Biscay: a regional distribution from a seasonal perspective“, by Irene Ruiz et al.

Summary and scientific relevance:

This manuscript aims to investigate the seasonal trends of floating litter from riverine sources in the southeastern Bay of Biscay. Data from surface drifters were used in addition to virtual Lagrangian particles to determine the pathways of floating litter from riverine sources into the Bay of Biscay. The simulated particles were forced with high-frequency radar-measured currents and simulated wind fields. In addition, trajectories from four surface drifters were used to parameterize the wind drag coefficient of the particle tracking model.

Furthermore, the authors characterized riverine litter output by collecting litter with a transport barrier in the Deba river to gain insight into the typical types of litter and the buoyancy of items released from the rivers into the marine environment.

The scientific relevance of the present study is very high. There is still a significant deficit in understanding the dynamics affecting litter transport from the estuarine environments to the marine environment. Moreover, improved beaching parameterizations for numerical
models are of great importance for accurate predictions of marine litter dispersal.

However, there are some concerns about the overall structure, language, and analytical methods before the manuscript can be published in Ocean Science Discussions. Therefore, I recommend a thorough revision by the authors.

**General comments:**

The manuscript needs comprehensive language editing. There are a lot of spelling mistakes and many sentences are unclear to me. A thorough language editing for the manuscript is necessary to publish this study in Ocean Science.

**Introduction:**

The Introduction should be shortened. There are reiterative sentences and sections which are disconnected. Furthermore, technical details of the radar data should be moved to the methods section. References to webpages should be deleted as they just load the text.

**Windage:**

The method used to calculate the wind slip of the particles is questionable. The referenced numerical studies do not simply add different windage values and estimate the distance of the trajectories. Please go more in-depth here and use an appropriate method to compare your numerical trajectories with those of the drifters.

Furthermore, as I understand it correctly, the particles were re-initialized every 4 hours on the drifter trajectories. This may neglect submesoscale processes that significantly affect the dispersion and distribution of floating objects in the ocean. The effects of tides may be
underestimated, which of course, also play an essential role in the propagation and
dispersion of particles in the Bay of Biscay. Please strengthen the study in this regard.

**HF radar current observations and wind data:**

The methodology of how the HF data is extracted and assimilated with the wind
observations is, in my view, unclearly described. How are these data products
incorporated on a uniform grid for further analysis? In addition, lines 178-180 indicate
that the data extraction is questionable. Please clarify precisely how you extracted the
data and what criteria were used for the quality check.

**Particle transport model:**

This paragraph does not describe the particle tracking module. The information given here
is repetitive and only explains what the intent is for the particle simulations. Please
describe exactly which way particle tracking was used. Are concepts for horizontal
diffusion included and what scheme is used to move the particles forward in the module?
It is not sufficient to cite studies that have used the same particle tracking module.

**Discussion:**

The various sections of the discussion seem very disconnected to me. I encourage the
authors to streamline the discussion and bring together the multiple aspects of the study.
Please try to connect the different aspects of the study (litter distribution, particle tracking
and windage) in a better way in the discussion.
Regarding the limitations of the model, there are some other problems besides the points raised by the authors. For me, some points remain very unclear. How are the data sets for currents and wind assimilated? What effect does diffusivity have on the pathways of particles in the model or on litter or drifters in the ocean? Does a 4-hour reinitialization of particles suppress tidal effects? All of these questions should be carefully discussed and considered. This is especially important for coastal areas where complex submesoscale processes, fronts, and strong tidal currents become important for particle transport. In addition, Stokes drift is significant for transporting floating objects in the ocean. This should also be discussed in this section.

Specific comments:

- I do not want to make remarks about linguistic and spelling mistakes. There are some significant spelling errors such as "week" instead of "weak" or "self-currents," which probably means "shelf-currents". I encourage the authors to carefully revise the manuscript for language and spelling if they decide to resubmit it.
- Figure 5: The authors mention in the caption "trapezoidal integration" I can't find this in the methods chapter. Please explain this in-depth in the methods section as well.

- Please use consistent upper- and lower case in subsection headings.

- In line 127, a figure from another publication is cited. This should be avoided.

- Lines 115 and 311 are contradictory.
Section 5.6 contains a lot of information about visual observations of litter with camera systems. For me, this is not related to the results of this study. If I understand it correctly, the study was conducted as part of the LIFE-LEMA project. This is also mentioned for the first time in this section and it is confusing to mention it here. Why is the camera system data not included in this study if the project also collected this data? I would recommend including the data or not mentioning it in this section.