

Interactive comment on “Technical note: On the importance of a three-dimensional approach for modelling the transport of neustic microplastics” by Isabel Jalón-Rojas et al.

Anonymous Referee #1

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The authors present a comparison of a 2D with 3D microplastic offline transport modelling approach to demonstrate the importance of applying a 3D model. Hydrodynamical forcing from the Princeton Ocean Model (POM) for the period 24 June to 11 July 1998 is used. The paper addresses an actual and interesting issue. The following questions should be clarified:

- What is the spatial and temporal resolution of POM ? What is more or less the size of the first sigma layer for the 2D approach and how does it compare to the mentioned 5m layer thickness (page 2, line 7) ? Assuming the layer is narrow (<5m), does the results differ if you average over the first two or three surface

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near layers ? How does the 2D layer thickness compare to the average particle depth from the 3D approaches (0.7 and 2.5 m, page 3, line 17/18) ?

- On page 3, line 4 it is written that your aim is not to discuss typical patterns of the microplastic transport and sinking in Jervis Bay. To which extent are your findings transferable to other regions ? Do you think that under certain circumstances a 2D approach could be sufficient ?
- How are the hydrodynamic conditions inside the Bay ? Is it possible to find different periods with different hydrodynamic conditions (stratified, mixed) to generalize more the findings ?
- Do you have informations about the turbulence from POM ? How does it compare to the vertical diffusivity coefficients used for the transport model.
- The density, the size, the shape and the buoyancy of the particles do not go into the study. Can you discuss this point in how far this influences the results ? Microplastic contains a large variety of substances and shapes ?
- Waves are not mentioned. Do you have an idea of its impact and how it compares to the demonstrated differences of a 2D and the 3D approaches ?
- Page 6, line 1: How do you justify your statement that a 3D approach can improve the accuracy ? You see from your study the different outcomes of the different setups, but not how they compare to reality. Particle physical properties (page 5, line35) are not taken into account.