

Interactive comment on “Numerical modelling of physical processes governing larval transport in the Southern North Sea” by M. C. H. Tiessen et al.

Anonymous Referee #1

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Understanding recruitment dynamics of marine fish is a highly relevant topic to gain insights into how ecosystems, single species and group of species with similar characteristics function. Bottom up drivers like temperature acting on the physiology and hydrography acting on the dispersion or retention of a population from or in a certain area are often considered to be of high importance. The presented manuscript deals with the impact that the hydrography has on the early life stages of plaice in the North Sea and is therefore well within the scope of OS and tackles an important research question. The manuscript is, as the authors also state, is one study in a row of studies that have been performed previously and that deal with the influence of transport on settling success, but here the focus is mainly (not solely as temperature dependent development is included) on the physics and the interannual difference that different transport x temperature regimes generate. Thus the paper not present novel concepts

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but new tools (a new parameterized hydrodynamic model) and a different view point were applied. The authors present an extensive and detailed analysis of different drift studies and thoroughly validated the model against field observations. The discussion mainly focuses on technical details like which spawning areas were chosen, how behavior, mortality and temperature (might) have changed the results the sensitivity of the outcome but the findings on interannual variability the different states of the system that lead to favorable or unfavorable conditions, the implications that a longer vs. a shorter transport duration would have on the stock etc. are missing. Therefore the discussion is also relatively short (4 pages) in contrast to the 10 pages and 13 figures (not including the sensitivity and validation studies) of results. The methods and assumptions are valid and well described and allow their reproduction by fellow scientists. Parts of the result section (especially the validation part) should go into the Material & Method section. The authors give proper credit to related work and clearly indicate their own new/original contribution, the title clearly reflect the contents of the paper. Due to the previously mentioned shortcomings of the discussion also the second part of the abstract could benefit from a more thorough investigation on e.g.: what patterns (strong wind from xy direction lead to x% less particles that settled etc. temperatures above x°C increased settling success by ...) lead to which observations and what are the implications for the species in such years. The overall presentation is well structured and clear, but due to the high number of graphs and results the figures could be reorganized and the result part would benefit if each paragraph would start with a summary of the findings described in that part. This has been done in some paragraphs but not in all and would increase the readability and understanding in my point of view. The language fluent and precise but I found some grammatical and typographic errors (listed later) but that will not be exhaustive as I am not a native speaker.

technical comments: page 3, L 19: change become into come page 3, L 29: delete a page 4, L 15: Were particles stopped as soon as they settled. Could particles settle in different locations. If the first settling location was used does that have implications on the results and which? page 5, L 5: Change mile to miles page 5 L 12: How were

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temperature included, as start values or for daily adjustment of the modelled values? Were they only included in the coarser model? page 6 L17: change latter to later page 6 L 20 change perquisite to prerequisite page 7 L 1 – 24: Put this paragraphe into the M&M section page 7 L 25- page 8 L 4: Put this part into the discussion page 11 L 23: change intern to inter page 12 L 1: change Holland to Dutch page 12 L 16: Plaice eggs are positively buoyant and are therefore mainly located in the upper water column. Is the setting with random distribution over the whole water body realistic and would it change the results and findings? page 13 L13: The instead of he page 13 L 17: replace coarseness with lower resolution page 14 L 2: Why were 120 days chosen if this was not sufficient to fulfill a complete development? page 14 L 18: When were plaice allowed to settle? If there was no restriction, is it valid to say that already yolk sac larvae could settle and would the results change if not the first settling location would be taken (see earlier comment) page 15 L 12: Wasn't the maximum 120 days? page 15 L 19: include did page 15 L 25: showed an instead of showed a page 18 L 13: Later instead of latter Figure 3 and 2 could perhaps be combined Figure 4 should go together with 7 for an interannual comparison and should include a smaller version of Figure 1 to indicate the start areas Fig 5 could go together with Figure 9 to allow for an interannual comparison In all maps shift the D for Germany upwards as at the moment it looks like the DK belongs to the German coast Include the latters a) b) c) d) in the figures Figure 6 and 10 could be combined to allow for interannual comparisons Fig 11. Give percentages as well on the y-axis label Fig 11 I do not really understand the legend and the color coding. You have particles that make it to the nursery which are blue. Then you have the fraction that do not make it. These can be separated into those that have not finished the larval stage (over the 120 days) which are red and you have those that do not reach a nursery which are gray. What exactly are the orange? Did the red ones reach a nursery but are not finished with development? Fig 12: This figure might be different if particles do not settle at the first suitable place. Is this of relevance? Fig 13 14 15: I would have expected more of these results in the discussion and the relevance they have for plaice.

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Interactive comment on Ocean Sci. Discuss., 10, 1765, 2013.

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