Summary

I gratefully thank the authors for having taken my comments into account and for their efforts to revise the manuscript. This revised version reads well and resolves almost all of my original concerns on the model's limitations and wider relevance of the study's findings. I have just one general comment concerning the updates to the model validation and several minor comments motivated by the authors' revisions. I would recommend the manuscript for publication subject to any minor revisions needed to address the comments made below.

General Comment

While I am very grateful to the authors for responding to mine and Reviewer #1's concerns regarding the rigorous assessment of the SCARIBOS model, I still believe that there is an opportunity to improve the validation of the simulation included in the revised manuscript.

The authors' addition of a graphical comparison between the GlobCurrent dataset and SCARIBOS model is a welcomed one. However, I would strongly recommend regridding the SCARIBOS model output onto the coarser grid of the GlobCurrent data to allow for an equivalent comparison between the two products. This would also enable the authors to present the [model - obs.] bias of the simulated surface current field when compared with GlobCurrent observations. Naturally, there would still be a caveat that the SCARIBOS model includes more than just the Ekman and geostrophic contributions to the surface velocity field, but this would still be more informative than the current visual comparison.

On a similar note, I believe that Figure 4 could be improved by visualising only the model surface current velocity vectors co-located with the ADCP observations while retaining the background colour contours representing the surface currents of the entire model domain. This would allow for more of an 'apples-to-apples' comparison since the authors have already selected data for the observational period between 4th and 22nd January 2024.

Finally, I believe greater attention should be paid to validating the SCARIBOS model's ability to represent ocean properties, given that communicating the model's overall fidelity will assist future researchers considering using the simulation in their own work. In particular, I would suggest validating the sea surface temperature and sea surface salinity fields outputs by the SCARIBOS model against relevant observations (e.g., OISSTv2 – see Huang et al., 2021 - and the Multi Observation Global Ocean Sea Surface Salinity product – see Droghei et al., 2016). Moreover, it also occurred to me that the GO-SHIP / CLIVAR Repeat Section A22 (last completed in 2021) intersects the SCARIBOS model domain, and thus may provide an insightful meridional-cross section

with which to compare the model's temperature and salinity field as part of an improved Figure 7 (which does not currently include observations).

I would like to emphasise that the suggestions above are intended to give the scientific community even greater confidence in the SCARIBOS model, and hence encourage the wider use of this simulation beyond this particular study (which itself will serve as the documentation and validation of the model going forward).

Minor Comments

Line 298-299: When does particle seeding conclude in Scenario 3? I could not determine from the current text whether particles are still being released during the final month of the simulation (i.e., February 2024) and, if so, how are these dealt with in the Lagrangian analysis? For example, do you take into consideration the much longer advection time for those particles released in 2020 compared with those released in 2024?

Figure 8: Suggest using two separate colorbars for the upper and lower plots given that the colorbar is saturated in the lower plot, but not in the upper plot. This makes the upper plot appear washed out and does not highlight any prominent pathways.

Lines 391-394: Could you quantify this description of strong flushing events somehow? For example, is it the case that particles released in DJFM are more likely (higher proportion) to leave the model domain via the northern and western boundaries compared with those released throughout the rest of the year?

Figure 9: What is special about 2021 for the connectivity of Source regions 6, 7 & 8? This interesting anomalous lack of connectivity feels worthy of comment; what is this related to in the surface circulation?

Section 3.4: One intriguing question that came to mind re-reading this Section was: what conditions give rise to the anomalously high and low coastal connectivity values shown between Bonaire and the Venezuelan Islands and Curaçao. We'd certainly care strongly about instances of the former, especially in the context of marine pollution and its wider impacts. Are these episodes of enhanced coastal connectivity predictable?