Dear Referee,

to start with, let me thank you for your review and the time you spent on the evaluation of the manuscript. Below you will find my preliminary answers to some major points you raised.

Of course you are absolutely right that "*there is an extensive literature showing the high sensitivity of particle trajectories to their seeding and the use of LCS to characterize it*". However, the results of these studies are always site specific and I am not aware of such results for the German Bight area. The present study does not introduce the identification of Lagrangian coherent structures (LCS) as a new technical approach but rather describes LCSs that might be relevant for the proper interpretation of German Bight monitoring data. I do not agree that the shapes of the large LCSs, certainly also constrained by the bathymetry in this specific region, are trivial or were foreseeable.

Unfortunately, in its present version the manuscript does not explicitly state that the underling 3D model BSHcmod is baroclinic. The specific model was chosen for two main reasons:

- **First**, the model has been run operationally by the German authority BSH for many years, practical experiences were gained also in the context of search and rescue. Your question "*has Lagrangian validation ever been performed using drifters?"* can be answered in the affirmative. Two studies on this issue (Callies et al. 2017b, 2019) are referred to in the manuscript. However, it might probably be good to mention these studies also in the context of the model description.
- **Second**, the operational model was chosen exactly for the reason you mention in our review "*… since the model based results are envisioned to be used in support of the observing system, possibly also in real time.*" BSHcmod results are reliably available on an everyday basis. Of course, higher spatial resolution would be useful, but such simulations are not available operationally.

I am puzzled as to why you say that "*I do not see a "striking similarity" between Fig.1a and 1b, where the main North-South ridge is absent.*" Actually, in Fig. 1b the FTLE ridge from Fig 1a is very clearly reproduced in terms of a line (green) of convergence. This and other lines of convergence are more or less perfect copies of the FTLE ridges (black) in Fig. 1a. The agreement is indeed striking.

I agree, however, that the display of temperatures in Fig. 4 is probably problematic. LCS related temperature differences exist, but of course they are small relative to gradients that occur towards the coast. Probably a more specialized colour scale should be chosen to resolve and highlight the details of specific interest. Nevertheless, I think that even now the structures in the FTLE fields can be identified also in the temperature fields.

You would like to see answers to the following questions: "*How do LCSs vary on time? At which scales? Which proxies can we use to quantify these changes?*" The first question can hardly be answered based on a necessarily limited number of figures in the manuscript. This is why a video was provided in the supplementary material, showing the evolution of FTLE fields over one full year. This video also answers your second question. However, probably an extra paragraph should be added to better summarize features seen in the video. Your third question is the most difficult one. It is addressed in the last paragraph of the conclusions. It would be extremely useful if LCS could be predicted via a simple dependence on atmospheric forcing. However, as the LCSs may depend on wind histories over extended periods of time, such a relationship cannot easily be established. This is why the manuscript leaves this aspect for future research.

You are asking for a more practical application of the results. I fully agree with your statement that "*… the angle mentioned by the author in the Introduction regarding the characterization of an observing system composed of fixed points is interesting*." Contributing to better interpretation of monitoring data is indeed the main idea of this study and the text should probably lay even more

emphasis on this application. However, a comprehensive example data analysis would have to involve a proper discussion of many different aspects, including all types of observational errors and unresolved turbulent processes on a subgrid scale, for instance. This would definitely go beyond the scope of this study. The lack of such specific application is also the reason why monitoring was not mentioned in the title of the manuscript.

I hope my remarks can clarify some points that possibly were not described clearly enough.

Ulrich Callies