Topic Editor Decision: Publish subject to technical corrections (07 Jun 2019) by John M. Huthnance
Comments to the Author:
Dear Authors
Thank-you for your re-revised manuscript. I have now discovered that my interspersed comments on the referee comments were unfortunately somehow omitted from my message to you via the Editorial system. I am including them below with different annotation to distinguish what the referee commented (you saw that) from my comments thereon.
Anyway, I think that you have mostly responded in accord with what I suggested. But you should note my comments marked **. In respect of the second and third of these, I suggest that you might say a bit more at the end about how to design a follow-up experiment that could give results with a desired confidence level. Your conclusion is at present a bit vague about this.
Please also note "Detailed comments" at the end of what follows.
I am regarding these as "Technical Corrections" meaning that you should then upload your manuscript to the Copernicus / Ocean Science editorial system directly (no more intervention by myself). There will be copy editing and you should check that your intended meaning is retained.
Thank-you for publishing in Ocean Science.
Yours sincerely
John Huthnance

Answer: We followed your advice and provided more specific ideas for future experiments in the last paragraph of the conclusions section.

Referee
"The revised version of the paper does not address any of my main criticisms and comments, as detailed in the following."
Editor.
I think that most of these criticisms and comments are reasonable and should be addressed. When/if the manuscript is published, the referee comments will be available and readers will be able to see if they have been addressed reasonably.**

Answer: In the second iteration of the revision of the manuscript we added the tables the referee wanted to see. We also introduced another figure (Fig. 15) and revised the text in several places.

Referee
"The authors choose not to perform any statistical test, "since it would generate a substantial formal overhead without promising a clear benefit". My point is that testing should be done, rather than avoided, and the importance of the parameters should be tested rather than speculated."
Editor.
The benefit is better evidence about the "robustness" of the results, and possibly how many drifters in a follow-up experiment might be enough to give results with a desired confidence level.**

Answer: In our previous response, we addressed the problem that also the theoretical considerations behind the expectation of exponential growth, for instance, include simplifying assumptions. Uncertainties arising from these assumptions can hardly be quantified, which makes strict testing a questionable endeavour. The other, even more severe, problem is that the collection of data we

analysed did not result from different realizations within a well-defined experimental setup. During the three experiments we combined, weather conditions were quite different.

Referee.
"They did not provide the requested table quantifying initial distances between pairs and from OWFS, arguing that they are not defined in a clear way. I am not sure what do they mean…As a simple example, the "initial distance" in most papers is simply defined as the distance corresponding to the first data points…"
Editor.
I am sure you can choose your own reasonable definition for initial distances between pairs, e.g. as suggested. Obviously there is no one point for OWF location; however, shortest distance to a turbine pylon might be a meaningful measure for distance to an OWF – the choice can be yours as long as it is defined.

Answer: In the new Table 3, the nearest engine version of distance has been contrasted with an estimate based on the distance from the wind farm centre. Differences between the two approaches are substantial and ranking drifter pairs with regard to distance from the wind farm is not conclusive.

Referee
"They decided not to discuss and test the exponential fit. Their motivation is that there is no clear difference between results obtained using an exponential fit or other power law fits. But this is exactly my point!"
Editor.
I have to say that your text gives this comment much validity. The introduction, page 2 lines 31-33 says "Indicative of a non-local regime driven by flow features larger than drifter separation is exponential growth of relative drifter dispersion (LaCasce, 2008). By contrast, local dispersion with power law dependence on time should coincide with a shallower slope of the energy spectrum, indicating the presence of energetic small scale eddies." This implies that you want to distinguish between exponential and power-law time-dependence in order to distinguish between large flow features (or Lagrangian chaos, page 3 line 3) and small-scale eddies in causing dispersion.

Answer: The new Fig. 15 is now dedicated to the problem of distinguishing between exponential and power law fits. See our previous responses to the referee's comments.

Referee
"The exponential fit is simply not significant…"
Editor.
I think this statement needs qualifying. I guess that, assuming an exponential form, the exponent is very significantly positive. However, it might well be that a quadratic form could fit equally well and in view of the above you should try this.

Answer: We found estimates of power law exponents being more unstable than those of e-folding times in the exponential fit (we now mention that at the end of the third paragraph of Section 4.1).

See, however, Fig. 15 for a comparison of the exponential fit (non-local dispersion) with an increase as t^3, as it would be expected according to Richardson's law for local dispersion.

Referee
"And despite this, the authors mention in the abstract that "Drifter pairs can be classified in a remarkably clear way into those with spatial separation growing exponentially (and those growing) non-monotonically"."
Editor.
This is another matter! It seems to me that it is much easier to distinguish between exponential and non-monotonic behaviour than between exponential and quadratic. I think your non-monotonic plots 7a,b,d,e are indeed clearly different from those where you fit an exponential. An exponential cannot fit the overall convex shape. (A quadratic could but of course with the opposite (wrong?) sign of the t^2 term). So you could refute this referee comment.

Answer: We think that we now discussed the distinction between non-exponential (i.e. power law) and non-monotonic growth behaviour in a proper way.

Referee
"Overall, all my reservations on this paper remain the same, and i cannot accept it for publication in the present form. As already stated, the paper is nicely written and the authors are knowledgeable, but i think the results are not clear nor robust enough, and they do not add significantly to our understanding of the problem"
Editor.
I am not rejecting it at this stage, but you should please address the comments in the light of what I say above. This assessment of results seems fair, apart from your clear distinction between exponential and non-monotonic separation behaviour. Perhaps you might be a bit more specific about how future work might enable attribution of the different behaviours to context.**

Answer: In addition to our previous responses, we now outlined a more specific concept for future studies at the end of the conclusions section.

Editorial comments . . . . . [You saw all of this and responded].

Detailed comments.
Page 1 line 16 and page 3 line 7. Better "early-phase"? (with hyphen to avoid suggesting phase separation)
Page 13 line 8. Omit "in the"
Page 23 line 5. Better ". . increase approximately as r2/3, as expected . ."
Page 28 lines 3-4. Better ". . (GDP), Corrado . ."
Page 32 line 16. "are also" -> "also include"?

Answer: All the above changes have been made.