Ocean Sci. Discuss.,
https://doi.org/10.5194/os-2017-80-RC1, 2018

Ocean Science
Discussions
Open Access
EGU

Interactive comment on "Consideration of various aspects in a drift study of MH370 debris" *by* Oleksandr Nesterov

Anonymous Referee #1

Received and published: 17 January 2018

In this paper the author makes a very detailed study of the MH370 debris dispersion after its crash in the Indian Ocean. The study includes aspects that have not been previously considered, such as information about the temperature experienced by the flaperon, on its route to La Reunion where it was found, obtained from biochemical analysis. In my opinion the study provides very interesting conclusions and deserves publication in Ocean Science after clarifying some aspects that are unsettled in the current version of the manuscript.

1. The author provides an exhaustive bibliographic list, however I miss in this list the work by JA Trinanes et al. Journal of Operational Oceanography (2016).

2. Could the author provide references that explain how Eq. (8) is obtained? How

does it relate to the Maxey and Riley's equation of motion (Maxey and Riley, 1983) of a rigid spherical particle in a fluid ? Why Eq. (8) does not depend on the density of the floating object?

3. When integrating the equations of motion for each object there is a contribution of the ocean and wind velocity fields at each point. These velocity fields are subjected to uncertainties intrinsic to the models used to produce them. In this way HYCOM velocities differ from those supplied by other consortia producing global velocities, as for instance the COPERNICUS Marine Environment Monitoring Service. Could the author comment on how conclusions would be affected when using different velocity sources?

4. Simulations are performed considering ensembles of 50,000 particles. Movies such as S2, S3 or S4 confirm that this number of particles, in late stages of the simulations, leave numerous gaps and this could affect the conclusions obtained in these dates. Has the author obtained similar results considering higher number of particles in the ensembles as for instance 500,000 or 5,000,0000?. Additionally it would be useful if a date is included in each frame for movies S2, S3 and S4.

5. The random leeway factor used to produce figure 5, is a random distribution across the particle ensemble fixed in time or randomness varies in time?. Please clarify.

6. The paragraph explaining figures 5, and 6 and table 2 is unclear and thus the information contained in those figures and table is not understandable. The search areas marked in grey tone in Figure 5 were not considered during the whole period. For instance grey areas in the 1st column of figure 5 are early search areas, that were not considered in April. Why they appear in the second column? In the second column the grey areas appearing in the upper part were considered in later dates. Why are they sketched for April 5? Search areas change with time, therefore could the author explain how he defines cumulative coverages and why

they say something in this case? Could the author define how the magnitude represented in the vertical axis of figure 6 (Maximum daily coverage) is defined? What is the meaning of the color code in the bars of figure 6? What case, random or constant leeway, is explained in the paragraph from line 47 to 57? To what figure refers that paragraph? Table 2 is unclear: what kind of leeway uses?; what is the meaning of the dates there?; how magnitudes appearing in the upper row are defined?.

7. The autor states in lines 25-27 that: *If the SST at particle's location never reached 23°C, or never dropped below 19°C after that, such a particle received zero score*. However I do not see how this occurs by evaluating Eq. (18). For instance a particle which never reaches 23°C but drops to 16°C in the second period would score 0 in the first interval, 1 in the second time interval and 0 in the third one if it remains at 16°C. This according to (18) would score (0+1+0)/3 and this is not zero as stated by the author. Please clarify.

8. The information contained in figure S5 could be better interpreted if that figure is replaced by a movie made of the 40 frames displayed in the figure. It would be more intuitive if each frame included the initial point of the ensemble by marking it on the map instead of giving its geographical coordinates. The movie should include also the heading of the figure and the colorbar. The remaining information contained at the bottom of figure S5 could stay in a figure.

Please also note the supplement to this comment:
https://www.ocean-sci-discuss.net/os-2017-80/os-2017-80-RC1-supplement.pdf

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