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Interactive comment on "Lagrangian Trajectory Modelling for a Person lost at Sea during Adriatic Scirocco Storm of 29 October 2018" *by* Matjaž Ličer et al.

Anonymous Referee #1

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Review of : Lagrangian trajectory modelling for a person lost at sea. . ..

By Licer et al

The subject of the paper is relevant, since it evaluates the performance of two Lagrangian models versus a real accident with a person lost at sea during an extreme meteorological event. The paper implementation though lacks in my opinion of several crucial elements. I therefore recommend re-submission, and ask the authors to address the points detailed in the following.

1) In Section 1, the authors introduce the reconstructed trajectory of the survivor (Fig.1b), that they use to test the two proposed models. I find the trajectory and the

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associated uncertainty (500 m radius) quite arbitrary. Was the survivor in possession of a GPS, or at least of a watch (time information)? If so, this should be mentioned, and if not, how did he estimate time and position of the trajectory?

In absence of solid information, I think that the evaluation should be based mostly on the only secure data point, which is the beaching point (in space and time) of the survivor, rather than trying to quantitatively match the specific positions evaluated along the trajectory.

2) The description of the two Lagrangian models is inconsistent, the conceptual differences between the two are not clearly outlined, and a number of basic information that are then used later on in the paper, are not provided. Specifically, why is the particle equation written for Flow Track (Section 4.2, eq 1) and not for OpenDrift (Section 4.1)? If the basic equation is the same, it should be introduced in Section 4.1 and the differences in parameterizations and considered processes should be discussed up front, for instance in terms of wind drag and lift, Stokes, turbulence etc..

Also the model implementation should be better discussed. How many particles are typically launched in each model? (this is mentioned for Flow Track but not for OpenDrift) How are the results diagnosed? In Section 5, it is mentioned that for OpenDrift a Rescue Area (RA) is computed as a polygon based on particle location, while in Section 5 and 6, it is mentioned that a RA cannot be computed for Flow Track. . . I do not understand why is it so, and I think it should be better explained. Also, all these aspects should be presented up front in Section 4, rather than at the end of the paper.

3) The discussion of model evaluation in Section 5 is in my opinion very unclear. The paragraphs at pg12 and 13 for PIW and PPV are simply repeated with the RA values changed. . .What are the grey shading areas shown in Fig. 8-10 and how are they computed? I do not see a clear difference in the three cases. The authors seem to favor the results of OpenDrift PPV because the RA is more reduced (even though it still covers the whole Gulf?), but the RAs are not shown in the figures.

In general, as mentioned in point 1) I think that the quantitative assessment should be based mostly on the beaching point. What is the distribution of beached particles in time and space for the 3 configurations?

4) The conclusions (Section 6) are in my opinion not satisfactory. The authors mention that OpenDrift is more suitable for Search and Rescue applications because it is more operational, i.e. it has a classification for object parametrizations, and it provides RAs. But these points were known from the beginning, given the model characteristics! What is the added value of the comparison?

I think the authors should discuss in an objective way the results, and indicate strength and weakness of each model with respect to the actual performance. Of course, it is also important to point out the shortcoming of Flow Track in terms of operational performance, but indeed that was a given and we did not need this exercise to reach this conclusion. . .

5) Finally, I would like to make a general comment. From the patterns of currents and wind (Fig.5,7), it looks like the trajectory of the survivor was likely to be strongly influenced by the ocean currents (that facilitate the entrance inside the Gulf,) while the trajectories of both models tend to overestimate the wind influence (that moves them more to the north-west).

Indeed Fig.6 shows that the wind input in the Lagrangian models is approximately double with respect to the currents (please clarify the dimensions of the variables in that Figure: are they velocities or are they model inputs somehow normalized?). On the other hand Fig.5 shows that the NEMO current amplitude is underestimated with respect to the HF radar.

So, it is possible that improving NEMO results would greatly improve the trajectories of the Lagrangian models. Alternatively, could the HF radar results be used as inputs in the Lagrangian models? I understand that there is a permanent gap in the middle of the Gulf, likely due to the GDOP, but probably gap filling techniques can be used to

ensure a more extended coverage. The authors should explore these aspects.

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