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Ocean Science Discussions

Interactive comment on "Simulations of ARGO profilers and of surface floating objects: applications in MFSTEP" *by* C. Pizzigalli and V. Rupolo

C. Pizzigalli and V. Rupolo

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Answers To Referee 1 Title of the manuscript: 'Simulations of ARGO profilers and of surface floating objects: applications in MFSTEP'. Authors: C. Pizzigalli and V. Rupolo

Referee 1: First of all, I have to say that the review procedure adopted by this journal is very unusual, namely, it is not designed to obtain the best feedback from the reviewers to the authors.

No Comment

Referee 1: The manuscript in question is pretty much a soup of a lot of things. First of all, it concerns ARGO drifters, which are primarily designed for sampling of hydrog-

raphy, for which they are fine. But if one wants to know something about dispersion, their up and down sampling strategy (Fig. 1) can drive one crazy. Some scientists do not want to have anything to do with that (like myself) given other substantial issues that needs to be understood about Lagrangian dynamics, but others are courageous to attack it straight and play endless games with these.

The manuscript is composed by two separate parts. With regard to the ARGO floats we describe the activities performed in MFSTEP devoted to design the MedARGO experiment. We do not face the problem of estimating dispersion. We simply use numerical models to try to define a good time cycling of the profiler in order to maximize independent profiles. Fully aware of the complication given by the up and down movements, we use also numerical model to study the error on the determination of mid-depth velocities, which is also an important issue (e.g. track back the references to the paper of Davis 1998 JGR), even if we agree that ARGO are primarily designed for sampling of hydrography

Referee 1: Second, one can release a huge number of drifters in models and go about interpreting them. The accuracy of numerical simulations is then a function of the Eulerian model accuracy. Even in a super-well validated numerical model, Lagrangian paths are tough to get right. This is because all errors, namely errors due to forcing functions, missing model dynamics and model resolution, all gang up and accumulate as errors in dispersion prediction. Again, some people would hesitate with these doubts, and others will go right ahead.

We agree with the reviewer that Lagrangian trajectories derived from Eulerian numerical model integrate all the errors of the model dynamics, making extremely difficult prediction in dispersion properties. Comparing numerical and real Lagrangian trajectories is perhaps the more stringent model validation procedure. On the other hand many efforts have been done in the last decade for improving the Eulerian models and considering that many practical problems may be addressed only in the Lagrangian framework we believe that a prudent use of Lagrangian diagnostics is something more

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than ‘an endless game’. In the revised version of the manuscript we discuss in more detail the model limitations but we did not change the philosophy of the work. We want only to stress that when possible we compared results with real data and that when computing Lagrangian transport we always followed a statistical approach considering space and time scales (sub basin transport, weeks) well resolved by the model geometry and space and time forcing resolution.

Referee1: Third, one can go ahead and do a huge number of statistics etc based on these results. The authors have even included things about wars in the Middle East (Fig. 8) and samething about fish larvae. Nobody knows if these results are right or wrong or even sensible. Obviously, the authors are not concerned.

We are concerned with comparison of numerical and real Lagrangian dispersion (Pizzigalli et al., 2007) and the oil spill from the war in the Middle East (not present in the revised version) was considered to show an example of such comparison. With regard ARGO floats, in the present version we added a further comparison between real and numerical cycles.

Referee1: This is all very interesting, light and probably of interest to those in operational programs. Personally, I do not find it very instructive. What have I learned after reading this manuascript? I can’t tell...

The manuscript was submitted for a special issue concerning activities and results of an operational program.

Referee1: In summary, I have a philosophical issue with such approaches

We understand the philosophical issue of the referee even if we believe that a prudent use of Lagrangian diagnostics may be add important useful information in operational programs

Referee1: It could be a matter of taste. If this journal publishes such studies, I suggest to go ahead - I can provide no detailed comments. If this paper was submitted to

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the usual JPO, JGR, JTech, Ocean Modelling etc, I would have had pretty substantial criticism.

No Comment

Interactive comment on Ocean Sci. Discuss., 3, 1747, 2006.