

Review of “Riding on the fast lane: how sea turtles behave in post-nesting migration” by Wang et al. submitted to Biogeosciences

General comments

A general comment is that the authors often state speculative conclusions as if they have been proven right. One example among many: "After arriving at Tarama Jima, she slowed down and moved in the vicinity for over 10 months until 17 August 2011, indicating that this area is her foraging ground" (lines 13-15 on p. 9). We do not know the last part — or, at least, the authors have not shown it. I have another interpretation of the data: the turtle was tired and decided to take a rest; the currents being weak in this area, it *appears* she was foraging although she was just napping. There may be other interpretations but none of them can be supported by the data; the data sampling were not designed to answer this specific behavioral questions. Hence, I would like the authors to re-read and re-write carefully their paper and use a less definite language when describing conclusions that are only speculative.¹

The authors need to show more care about the error in their estimate of the swimming velocity. To be honest, I am highly skeptical that you can estimate this velocity accurately; from a lot of experience using model and data, I never encountered any data-assimilating model (even with several-kilometer resolution) that could reproduce accurately the observed current at one location and over several consecutive days. Statistically, yes (as you mention in lines 14-16 on p. 14 for the current model) but not point wise in time and space. The statement “EASNFS provides reasonable estimates of ocean currents” on p. 14 is far from satisfactory.

How to fix this? I think, as a first step, it would be important to estimate first the error in the current velocity from the model — using, for instance, surface drifters. There should enough drifters that have historically passed by in the specific region to estimate of it. In your response to Ascani’s comment, you show the standard error of the mean from drifter data; what I would like to see are similar statistics but for the error velocity between drifter and model. If you show that this error is generally small — much smaller than typical swimming velocities — then I, and others, will be convinced by the rest of your results.

Major comments

- Fig. 4 and section 3.2: The rationale to use the AVISO data was to get an idea of the error in the ocean currents and, ultimately, on the swimming velocity (“Thus, for further comparison and validation, we also applied the currents from the compiled data set of AVISO-MADT (Maps of Absolute Dynamic Topography and absolute geostrophic velocities)” in section 2). Fig. 4 shows a case where the error between AVISO and the model is so huge that we should not be able to estimate accurately the swimming velocity. Yet, the authors simply state that the AVISO is wrong anyway so we should not trust it (I am paraphrasing); why using the AVISO data then in the first place? I think, on the contrary, that the differences between the AVISO and model currents should raise a red flag. Furthermore, if no other current dataset is used —

¹ An easy fix for the example cited above would be to replace ‘indicating...’ by ‘consistent with the fact that this location is known to be the turtle’s foraging ground’; you might think it is a subtlety but it shows you are more precise.

more accurate than AVISO — then, we should not be able to say anything about the swimming behavior of turtle T2012-60621. I think the authors are being overly optimistic in this case. See the second of my general comments.

- Fig. 5: Could you extend the drifting trajectories from the model and AVISO north of about 23.3°N to clearly see the difference with the turtle's trajectory as well as difference between model and AVISO?

Minor comments

- In section 3.1, the authors describe the trajectories of the turtles in terms of either passive drifting within currents or active swimming. Yet it is the *final* goal of the study to distinguish what is passive drifting and what is active swimming; we do not do this yet. So I found the choice of description premature at this stage of the paper. Instead, I would describe the trajectories in the most neutral way and use conditional tense whenever the authors want to refer to a passive or active behavior.
- Line 13 on p. 9: Avoid the use of “very” in a scientific paper.
- Is it appropriate to call a turtle “she”?