

Interactive comment on “Riding on the fast lane: how sea turtles behave in post-nesting migration” by Y.-H. Wang et al.

Anonymous Referee #1

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General comments:

The authors present a largely descriptive study of 3 Argos-tagged green turtle migration routes from east of Taiwan to their presumed foraging habitat in the Ryukyu Archipelago, approx. 1000 km away. The authors appear to have taken a great deal of care in using available physical datasets to characterise the current regimes experienced by the turtles, the treatment of the Argos tracking data is simply not up to a publishable standard. Furthermore, the sample size for this study is far too small to reliably test the stated hypothesis that the Kuroshio plays an important role in the post-nesting migration of green turtles. I expand on both of these critical issues below.

Specific comments:

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1. Argos tracking data.

The authors state that all Argos locations from classes B,A,0,1,2,3 were used "when they fit an apparent migration pattern". This statement implies that the authors chose to retain locations for their analyses based on their own impression of the turtles' true migration routes. This is purely subjective and is in no way an appropriate basis for filtering tracking data. The authors also provide no indication of how many Argos locations were removed from the tracks prior to analysis, although the number of locations presented in Figures 1-5 imply very few locations per migration track were retained. I question how much information on interactions with currents these 3 tracking datasets really contain.

The authors state the nominal Argos location error intervals (not standard deviations as stated in the manuscript) provided in the 1996 Argos Manual. Researchers have long known that these error intervals are rough guidelines, at best. Others have shown that the error standard deviations for the Argos location classes are, in several cases, far larger and differ substantially in magnitude between longitude and latitude (eg. Vincent et al. 2002. *Marine Mammal Science* 18:301-322).

A proper approach to analysis of these data would be to apply an objective filtering algorithm (e.g. Austin et al. 2003. *Marine Mammal Science* 19:371–383) or to use a state-space modelling approach to estimate the true migration routes from the error-prone Argos data (e.g.. Jonsen et al. 2005 *Ecology* 86:2874–2880).

2. Insufficient sample size.

Although the authors have shown that their three turtles do appear to follow the Kuroshio current during part of their migration, this is extremely weak evidence in favour of their hypothesis that Kuroshio plays an important role in the post-nesting migration of green turtles. Without some sense of the variability in migration routes and observed interactions with dominant currents, one simply can not judge how representative the authors' results really are. One can only understand this kind of variability by analy-

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sis of a much larger dataset - the kind of sample sizes used in the majority of similar studies cited by the authors.

Technical comments:

The results section is simply an over-long description of the specific migration paths of each turtle; this should be condensed down to only a single short paragraph and the remainder of the section should focus on a description of the results from the PCA analysis (wrongly presented as part of the discussion). Elements of this discussion section focusing on a decryption of the PCA should be moved to the methods section.

Biological/behavioural conclusions must be supported by references.

Interactive comment on Biogeosciences Discuss., 11, 11481, 2014.

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