

## ***Interactive comment on “Spatially explicit estimates of stock size, structure and biomass of North Atlantic albacore Tuna (*Thunnus alalunga*)” by P. Lehodey et al.***

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The presented study describes the application of an ecosystem based modeling approach to the stock assessment of Atlantic albacore tuna. The paper represents a useful and potentially important step forward, as fisheries scientists strive to do a complete job in incorporating environmental data in stock assessments. As such, the paper should be published.

There are, however, a few general criticisms that could/should be addressed. The first is that the work has been presented and peer-

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reviewed during the 2013 Albacore stock assessment conducted by ICCAT. The detailed report of the assessment may be found at [http://www.iccat.int/Documents/Meetings/Docs/2013\\_ALB\\_ASSESS\\_REP\\_ENG.pdf](http://www.iccat.int/Documents/Meetings/Docs/2013_ALB_ASSESS_REP_ENG.pdf). The scientists conducting the review of various methods for conducting the stock assessment concluded that the results from the SEAPOPDM model were not ready to be used for management advice, noting that “. . . there are still a wide range of uncertainties in the present analysis and results should be more carefully explored before being considered for providing advice.” It would be very helpful if the authors acknowledged this earlier review, and reported on the criticisms and recommendations for further research made in 2013.

Response - This is correct and the work presented here took into account the comments and suggestions made during the meeting. References to the SCRS documents were added with some text as follow:

In the discussion: “On the modeling side, there is a range of uncertainties in the present results that was highlighted and discussed during the presentation of a first version of this work to the ICCAT working group on the stock assessment of Atlantic albacore (Lehodey et al 2013). It was thus concluded that the results were not yet ready to be used for management advice (ICCAT 2013). Though this modeling study has been then revised and described in more details in Dragon et al. (submitted), there are still uncertainties and scope for progress.

To include the coastal domain where substantial amount of albacore tuna are caught, the spatial resolution needs to be increased. . . .

As noted above the fishing mortality was likely underestimated . . .”

In the acknowledgments: “This work was modified from a first analysis presented in 2013 to the ICCAT working group on the stock assessment of Atlantic albacore (reference SCRS/2013/125) and we are grateful to all the members of this group who provided useful comments accounted for in this revised study.”

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I also found that the rationale for selecting a maximum size of albacore based on species identification was surprising to me. Trained observers should have no difficulty identifying albacore, I would have thought.

Response - Albacore data with size > 150 cm (some of them being assigned a size > 2 m!) are obviously mistakes either from the observer or when entering data in the database. The database is covering a very long period involving many observers, so it is possible that a few of them had not sufficient training for species identification (or used non metric units, e.g. feets?).

Further complicating the logical development of the analyses was the assumption that Linfinity of 137 cm, which was greater than the 130 cm cutoff for the fishery samples. This apparent discrepancy needs to be explained.

Response - This value of 137 cm for Linf was imposed by the form of the function. It gives a size of 130 cm for fish of 15 yrs old. The text has been modified: "Despite the threshold value set to 130 cm (cf above), there were still a very large proportion of fish larger than  $L_{\infty}$ . An intermediate solution was selected with  $L_{\infty}$  set to 137 cm FL while a linear growth was assumed during the first year of life (Fig. 5b). Given the form of the function, the  $L_{\infty}$  value of 137 cm gives a size of 130 cm for 15 years old fish. Therefore, though there is no size data above 130 cm used in the model optimisation approach, a very small fraction of the population is assumed to reach sizes between 130 and 137 cm after age 15 years."

The authors also advocate the "rescue" of earlier catch and effort data that have incomplete spatial information, by raising the complete dataset by the sampling fraction that contains georeferenced information. While it is potentially useful to do this, there are some difficulties with this recommendation, as in many years, the available samples are small, and weighted towards only a few fleets. Thus, raising to the entire fishery could produce biased results.

Response - we agree that this is certainly not an easy task. But at least it would be

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important to use it in a sensitivity analysis to check how the biomass estimates and potentially the resulting management indices vary in relation to this source of uncertainty. The text has been modified: "While this approach may introduce further biases due to under-sampled fleets and years, it seems indispensable to conduct a sensitivity analysis with such a raised dataset for quantifying the impact of this source of uncertainty on the estimates of biomass and derived management indices."

The paper is generally quite well-written, but a critical review of the English would be helpful, I believe. Some suggestions follow below: P. 172. Remove references to models that have skills, as this is jargon. Please rephrase. Response - done

"Spatialized" (P. 173, line 14) catch effort data. Please use geo-referenced catch effort data, or (better) catch effort data with positional information. "Spatialized" is not plain English. Response - done

P. 173 line 26, replace "wrong data" with "errors". P. 174 line 19, omit "The" P. 175 line 6, add "the" in front of ICCAT. P. 175 line 7, remove "above" Response - all done

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Interactive comment on Earth Syst. Sci. Data Discuss., 7, 169, 2014.

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