

Interactive comment on “Future fisheries yield in shelf waters: a model study into effects of a warmer and more acidic marine environment” by S. M. van Leeuwen et al.

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General Comments:

This paper discusses the results of one-way coupling of the biogeochemical model GOTM-ERSEM-BFM and a size-structured model of pelagic predators and the benthic detritus based foodweb. This coupled model was then used to explore the potential future impacts from ocean warming and ocean acidification (both biotic and abiotic aspects). The model was applied to 3 different locations and this showed that future impacts differed between the sites and were influenced by the hydrodynamic conditions, though all sites became more pelagic in composition.

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The paper is well written and the work is interesting but the results need clarification or revision before being acceptable for publication. Specific suggestions are made below.

Specific Comments: 1. Lines 95-103: It would be good to see some reflection on what the expected downsides of not having 2-way coupling are. How do the authors account for consumptive losses in the plankton due to feeding by the fish fauna? Was the level of consumption of the same order as the assumed mortality? 2. Line 118: The fishing pressure that was included, what level was that pressure? Was it based on a particular year? Why was the fishing pressure assumed to be homogeneous spatially? What are the implications of the simplification? 3. Table 4: It is interesting that few changes are >40%, but still there are many declines in catches despite quite small changes in POC, primary production and biomasses. 4. Line 194: The pelagic and benthic biomasses do decline, but the pelagic ones in particular are small, would they actually be detected in reality? 5. Section 3.2: While there are many declines, the changes are typically small. Again are the declines of a magnitude that they would be noticeable in reality, they seem to be potentially negligible relative to likely noise level? 6. Line 266-267: Clarify this sentence, particularly the bit in brackets on food supply it is not clear what you mean here and the logic of the steps. 7. Line 301: “Pelagic fish food supply increased slightly due to indirect acidification impacts (figure 4d)”. This should be figure 4c in which case it dipped and rebounded... 8. Line 303: “Fishing yield decreases according”. I am not sure I would agree based on Figures 4e and 4f. Please be clear about whether you are talking about transients or snapshot end points. 9. Line 308: “Detritivore growth rates remain more or less equal...” I disagree, please make sure the results match the plot, which indicates an increase. 10. Lines 310-311: There is a decline in winter, but there is a big increase in summer, that should not be ignored. 11. Line 331-332: Interaction effects could be explored using the Hedge’s d method in Griffith et al 2012. Conservation Biology 26: 1145-1152 12. Line 364: What time scale is being considered here? When could monitoring schemes start to check for it? 13. Line 368: Griffith et al 2012 is an example of a paper that has already started to explore this topic.

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Technical Comments:

14. Line 73: Missing a fullstop after “light climate” 15. Figure 2.1: Define ROFI. Explain what the white space in the marine sections of the plot means. Does it mean there is no clear pattern for classification (i.e. transition zone)? 16. Table 3: It appears that the second rows is a duplicate 17. Section 3.2 and 3.3. For both of these sections (on Oyster Grounds and Southern Bight) please make it clearer when referring to acidification vs temperature effects, or combined effects. 18. Line 283: Should be “... enhanced by the direct acidification...” 19. Figure 3 (and Figures 4 and 5): The panels are small and hard to read. The colouring for the bar plots are not friendly for colour blind people. Could a different scale be used (or could the bar plots be broken into multiple panels) so that the temperature results do not obscure what is happening in the other cases. 20. Line 345: This would read more easily as “... aggravate or relieve the impacts of future pressures.”

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