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Interactive comment on “Impacts of hypoxia on the structure and processes in the pelagic community (zooplankton, macro-invertebrates and fish)” by W. Ekau et al.

Anonymous Referee #2

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Impacts of Hypoxia on the Structure and Processes in Pelagic Community Ekau, W. et al., BGD, 6, 5073-5144: October 22, 2009 In the full review and interactive discussion the referees and other interested members of the scientific community are asked to take into account all of the following aspects: 1. Does the paper address relevant scientific questions within the scope of BG? Yes; this manuscript helps address an important gap in ocean systems science which is the link between variable or changing biogeochemistry and ecosystem responses. It does so through a special focus on low oxygen as a forcing factor on species of pelagic zooplankton, macro-invertebrates and fish.

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2. Does the paper present novel concepts, ideas, tools, or data? Although, as the authors suggest, understanding the links between hypoxia and pelagic species is relatively novel, the paper is mostly a review of what is known. The inclusion of the most recent thinking about the integration of thermal, oxygen and CO₂ adaptation is novel in this context..
3. Are substantial conclusions reached? No. It is a review but it would strengthen its contribution if instead of conclusions it explored new areas that we should be thinking about in this domain
4. Are the scientific methods and assumptions valid and clearly outlined? It is a review so it relies on analyses undertaken and available through published literature
5. Are the results sufficient to support the interpretations and conclusions? Yes
6. Is the description of experiments and calculations sufficiently complete and precise to allow their reproduction by fellow scientists (traceability of results)? It is a good review of the field
7. Do the authors give proper credit to related work and clearly indicate their own new/original contribution? Generally yes, but there are several instances where a reference would be appropriate to support a statement which clearly not the result of this work (eg: p5077; ln2)
8. Does the title clearly reflect the contents of the paper? Yes
9. Does the abstract provide a concise and complete summary? It could integrate the different parts of the review better
10. Is the overall presentation well structured and clear? Yes
11. Is the language fluent and precise? No, the style is a bit informal and could benefit from a tightening up to increase precision and fluency
13. Should any parts of the paper (text, formulae, figures, tables) be clarified, reduced,

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combined, or eliminated? No 14. Are the number and quality of references appropriate? Yes

Comments: This manuscript is an important contribution to the growing understanding of the implications of shelf hypoxia variability and long term change on the physiology of species and organization of food webs and ecosystems. Although much work has been done on the response of organisms to hypoxia, most has been focused on benthic species and in near shore environments. This study expands this to focus on offshore pelagic systems. The review is well organized under a series of useful headings. It is especially strong at setting out the state of knowledge but it seems to do so largely uncritically. The case studies seem acceptable but they lack a discussion that makes it apparent how these systems are a useful way to understand the general problem / questions of the interaction of hypoxia with open ocean pelagic organisms.

However, the review is written in a disaggregated way where for example the recent and innovative work on the integrated physiological response of thermal, oxygen and CO₂ is not used to advance insight into the response of taxonomic groups to hypoxia or even the two case studies. Each of these parts of the document stands largely isolated. This is a pity because many of the new questions that may develop in this field are likely to arise from the integrating the three parts of the review. It is also written in an informal style which can be a bit off putting. Some more specific comments

P 5075: In 19: Duarte, 2008 not in reference list.... this suggests that there could be others so a careful revision of the citations is needed P5082: the ideas summarised from In15 are not carried through the paper to create a new perspective on the taxonomic or ecosystem levels

It would be useful to have summary tables for each of the taxonomic sections P5111; In1: Ref Rae is actually Duncombe Rae The paragraph about hypoxia in the Central Benguela (Namibia) needs to be clarified to highlight the nature of the variability (seasonal and interannual) and how this links to the POC and ventilation fluxes in order

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to understand the food web and ecosystem responses. For example it is important to clarify the ABFZ is a surface thermal phenomenon rather than an oxygen boundary... hypoxia is a sub-thermocline phenomenon this matters to species and lifecycle responses to both temperature and hypoxia. The mechanisms that drive the species and ecosystem responses in Namibia and South Africa are different It would be useful to see any time dependent data that shows a response to for example seasonal and interannual hypoxia It would be useful to get some thoughts about how the new insights about the integrated responses of temp, hypoxia and CO2 have meaning in a system such as the Benguela I am not a biologist but, why are giant squid emerging in California when hypoxia ostensibly favours small organisms? Overall, i recommend that this good review paper be revised to strengthen the forward looking aspects of where the science should be heading: those are a mix of the gaps within each section (integrated physiology, responses at taxonomic, species, ecosystem) and perhaps more importantly, their integration. It should also be thoroughly edited for fluency.

Interactive comment on Biogeosciences Discuss., 6, 5073, 2009.

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