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Interactive comment on "Ammonium excretion and oxygen respiration of tropical copepods and euphausiids exposed to oxygen minimum zone conditions" *by* R. Kiko et al.

Anonymous Referee #1

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With the advent of the accumulation of atmospheric CO2 and its subsequent penetration into the ocean, the evaluation of its effects on the physiology of zooplankton becomes an issue of wide interest of oceanographers. From this view, the oxygen minimum zone (OMZ) characterized by high CO2 accompanied by either low O2 or pH conditions, and the metabolism of zooplankton which visit OMZ regularly as part of their diel migration behavior are of special interest to predict possible consequences in the biogeochemical cycles of carbon and other elements in the world's oceans in the future. The value of this work is the evaluation of the response to simulated OMZ conditions of the rates of respiration and ammonia excretion of copepods and euphausiids. The objective is clear, methods employed are sound, and the interpretation of the results

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is appropriate in general. The finding that these regular visitors to OMZ are capable of extract O2 by reducing metabolism (or shift down Pc) under OMZ conditions are not new, but overall experimental designs elaborated by the authors are useful for the future research on the topic. I recommend publication of this work, provided that the authors address my comments below and make appropriate revision if necessary.

Comments 1: Were measurements of respiration and ammonia excretion made separately or simultaneously ? This is important for readers who are interested in calculating O:N ratios from the authors' data.

Comment 2: Compared Figs 3 and 4 (combination of 2 temperature levels and 3 air-saturation levels) with those in Figs 5 and 6 (2 temperature levels and 4 air-saturation levels), the number of data in the former are significantly less than those in the latter. For example, the data number of Undinula vulgaris at 10% air-saturation and at 11oC is 5 (1+4, Fig. 2), but that of the same species at the same air-saturation and at the same temperature in Fig. 5 is far more greater than 5. Please clarify.

Comment 3: Among 4 zooplankton tested, Undinula is non-migrant epipelagic copepod therefore is served as "control" which never experience temperature as low as 11oC and under-saturation of O2. Borne this in mind, compared with Pleuromamma this species exhibit no distinct features in the performance in respiration and ammonia excretion across O2 pressure tested at 23oC. What is the explanation for this ?

Comment 4: Incorporation of pO2 as a parameter of predictive models of respiration rate or ammonia excretion rate of diel migrating zooplankton into OMZ is not an easy task since the change in pO2 is more or less correlated closely with other parameters such as temperature, depth distribution, and time of the day. Perhaps, previous workers might be well aware complex interactions (known as "multicollinearity") between these parameters.

Comment 5: The format of Species column of Table 3 is inconsistent. Please correct.

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END

Interactive comment on Biogeosciences Discuss., 12, 17329, 2015.