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***Interactive comment on* “Structural and functional responses of harpacticoid copepods to anoxia in the Northern Adriatic: an experimental approach” by M. De Troch et al.**

**M. De Troch et al.**

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Dear editor, Dear referee,

we hereby provide you with our detailed answers to your remarks on our manuscript. The revised manuscript (including the corrections suggested by the second referee) is added in the ZIP file in the supplement. Our answers to your remarks can be find as a seperate file in the ZIP document as well, and see also below.

Don't hesitate to contact me in case of any further questions. On behalf of all co-authors I wish to thank you for your very valid remarks.

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with my best regards Marleen De Troch marleen.detroch@ugent.be

10, C301–C302, 2013 Biogeosciences Discuss., 10, C301–C302, 2013  
www.biogeosciences-discuss.net/10/C301/2013/ Discussions Authors' reply to  
the Interactive comment on "Structural and functional responses of harpacticoid  
copepods to anoxia in the Northern Adriatic: an experimental approach" by M. De  
Troch et al. E. Bonsdorff (Referee) ebonsdor@abo.fi Received and published: 13  
March 2013 Replies of the authors are indicate in bold italics

This is an interesting manuscript, based on well-performed experimental work, and analyzed using appropriate information. Figs and tables are clear and informative. Meiofauna are seldom included in studies such as this, and yet it is commonly accepted that meiofaunal organisms seem to withstand hypoxia (even anoxia for shorter periods), and also that recovery-rates are generally rapid (in part due to short life cycles, in part due to passive transport. - The authors appreciate these positive words of the referee. It is nice that he likes our work and that he underlines the need for this kind of experiments. My minor comment to this valuable contribution is thus that there are numerous studies on meiofauna and hypoxia from the North Sea (Giere's seminal work on meiofauna should be cited), and the Baltic Sea that could and should be included both in the general introduction and in the discussion-part. See e.g. papers by Elmgren & co (roles of meio- vs macro fauna), by Olafsson et al (meio/macrofauna, trophic status under environmental degradation - in press Mar Biol 2013), and Arroyo et al (J Exp Mar Biol Ecol 2012, vol. 420-421, and ydrobiologia 2006, vol. 554). For a general reference to the spreading of coastal hypoxia, see (it is a comprehensive study) Conley et al 2011, Env Sci Technol 45. The interesting issue of nematodes vs harpacticoids should attract more work! - We agree that there is a large number of papers available on anoxia/hypoxia. The ones suggested by the referee are indeed relevant for our study. - The following information from Elmgren (1978) was added to the introduction: 'Elmgren (1978) stated that oxygen-dependent zonation of the fauna can occur as macrofauna (> 1 cm) disappears at higher oxygen levels than some of the meiofauna.

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Especially nematodes are known to persist in low numbers in areas which have been anoxic for long periods.’ (p. 3 lines 5-8 in the word document). - Unfortunately the paper by Ólafsson et al was not yet available in the online first papers of Marine Biology. - The following relevant information from Arroyo 2012 JEMBE 420-421 was added to the introduction: ‘A comparable phenomenon takes place in the archipelago area of the Baltic Sea, where algal mats become stagnant in shallow embayments, covering wide areas in whose centre hypoxic and even anoxic conditions develop rapidly (Arroyo et al., 2012). The same study showed that the negative impact of hypoxia induced by drifting algal mats (eutrophication) was propagated to almost all levels of the trophic and functional chain, influencing species interactions even at the lowest levels.’ (p. 2, lines 20-25 in the word document). - Arroyo et al. 2006 *Hydrobiologia* and Wetzel et al; 2002 was cited in the introduction: ‘Moreover, the response to anoxia and the recovery from it can be size- (macrofauna vs. meiofauna) and species-dependent (Wetzel et al., 2002; Arroyo et al., 2006).’ (p. 2, lines 25-27 in the word document). - The reference of Conley et al 2011 was added to the introduction: ‘With worldwide more than 400 systems recognized, covering a total area of ca. 245,300 km<sup>2</sup> (Diaz and Rosenberg, 2008), hypoxia (defined here as DO levels  $\leq 2$  ml l<sup>-1</sup>) and anoxia (no oxygen) are among the top-list of emerging environmental challenges (UNEP, 2004; Rabalais et al., 2010) and were found to expand rapidly (Conley et al., 2011).’ (p.2 lines 13-16 in the word document)

The following references were added to the list: - Arroyo, N. L., Aarnio, K., and Bonsdorff, E.: Drifting Algae as a means of Re-Colonizing Defaunated Sediments in the Baltic Sea. A Short-Term Microcosm Study, *Hydrobiologia*, 554, 83-95, 2006. - Arroyo, N. L., Aarnio, K., Mäensivu, M., and Bonsdorff, E.: Drifting filamentous algal mats disturb sediment fauna: Impacts on macro–meiofaunal interactions, *J. Exp. Mar. Biol. Ecol.*, 420–421, 77-90, 2012. - Conley, D.J., Carstensen, J., Aigars, J., Axe, P., Bonsdorff, E., Eremina, T., Haahti, B.M., Humborg, C., Jonsson, P., Kotta, J., Lannegren, C., Larsson, U., Maximov, A., Medina, M.R., Lysiak-Pastuszek, E., Remeikaite-Nikiene, N., Walve, J., Wilhelms, S. and Zillen, L.: Hypoxia is increasing in the coastal zone of

the Baltic Sea, Environ. Sci. Technol., 45, 677-6793, 2011. - Elmgren, R.: Structure and dynamics of Baltic benthos communities, with particular reference to the relationship between macro and meiofauna, Kieler Meeresforsch. Sonderh., 4, 1-22, 1978. - Wetzel, M.A., Weber, A. and Giere, O.: Re-colonization of anoxic/sulfidic sediments by marine nematodes after experimental removal of macroalgal cover, Mar. Biol., 141, 679-689, 2002.

I warmly recommend publication; an interesting manuscript well-suited for this special issue on coastal hypoxia - Thank you!

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/10/C584/2013/bgd-10-C584-2013-supplement.zip>

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Interactive comment on Biogeosciences Discuss., 10, 2479, 2013.

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10, C584–C587, 2013

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