Biogeosciences Discuss., 10, C5730–C5732, 2013
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Biogeosciences Discussions
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Interactive comment on "Investigating hypoxia in aquatic environments: diverse approaches to addressing a complex phenomenon" *by* J. Friedrich et al.

Anonymous Referee #2

Received and published: 4 October 2013

This is an interesting and diverse compilation of short vignettes that briefly describe a wide assortment of approaches and instrumentations for monitoring aspects of different sites included in the "Hypox" project (EU-PF7)). Although the abstract refers to this MS as a synthesis of new information regarding measurements of hypoxia patterns, trends, drivers, and ecological/biogeochemical consequences for a spectrum of aquatic systems from lakes to open ocean waters, I would describe it as more of a potpourri of widely assorted individual studies. Many of these studies, however, implemented existing or novel instrument deployments that measured O2 and related variables at an impressive range of time and space scales. The MS provides enough information to wet this reviewer's appetite for new methods to address diverse research questions,

and this paper successfully displays the potential power of these approaches and technologies.

From the abstract's message, I was hoping to find a systematic analysis of how different approaches and instrumentations can be selected to fit different kinds of research questions and different scales of hypoxic conditions. Initially, I had hoped that this project was addressing the methodological question of which methodologies are best fitted to address which research topics in which kinds of low-O2 environments. I had thought that the authors' Table 1 might reveal a scheme where study sites were selected to represent different systems with different hypoxia scales congruent to those of Diaz and Rosenberg (2008, Science) or Kemp et al. (2009, Biogeosciences). Better yet, I was hoping to find a novel classification scheme around which this project was organized and sites had been selected. I had imagined that this paper might provide a guide to help researchers select instruments and deployment strategies for hypoxia studies. Although this was, of course, not its primary goal, the present MS does offer enough different examples to help future researchers with their study designs.

While the necessary brevity of each project description in "chapters" 3-5 precluded development of thorough analyses that generate deep scientific insights, many interesting results emerged from this large study. For example, I found the Black Sea's fine- or meso-scale temporal variations in the oxycline provocative and challenging for understanding physical controls (Fig. 8). I also liked how the graphical analysis of O2-temperature relations seemed to reveal an abrupt 'regime shift' in biogeochemical or likely physical processes (Fig 14). Other data presentations were a bit confusing (e.g., Figs. 15 and 18), and these begged for more analysis and explanation. The benthic faunal studies were generally not well integrated with the rest of the projects' research.

In summary, I would suggest that the authors should consider revisions that strengthen the integration of the presentation, including possible suggestions of appropriate monitoring approaches to address particular research questions in aquatic systems characterized by hypoxia dynamics at different time and space scales. This is a report from

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an EU-funded project, and the European literature dominates the paper's reference list. There is, however, a rich literature on hypoxia studies in the Americas and Asia, and it might be wise to expand the perspective of this MS by expanding reference to that work.

Interactive comment on Biogeosciences Discuss., 10, 12655, 2013.

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