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Biogeosciences Discussions

Interactive comment on "Impact of seasonal oxygen deficiency on the phosphorous geochemistry of surface sediments along the Western Continental Shelf of India" *by* Josia Jacob et al.

Anonymous Referee #2

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The western continental shelf of India experiences acute oxygen depletion in near-bottom waters on a seasonal basis. This manuscript focuses on the influence of this phenomenon on phosphorus geochemistry of surface sediments in the region. The authors find seasonal changes in phosphorus speciation in surface sediments, which they attribute to the prevalence of bottom-water anoxia. The conditions observed along the east coast of India are found to be quite different because of a different hydrographic regime. The results presented add substantially to what is known about the biogeochemistry of this region. However, I have two major concerns about the data.

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The first one is about iron measurements. It is not clear from the Methods section if "clean" protocols were followed during sample collection and processing. Did the vessel have a clean lab/container for handling such samples? I suspect that was not the case, which explains some very high iron values (exceeding 100 nM) at sea surface. If so, the iron data are not usable.

The second comment is on the way excess phosphate in water was computed (i.e. the difference between the LSM and SIM concentrations). While during the SIM the water column is well oxygenated, the bottom water oxygen concentrations are close to zero during the LSM. Thus, most of the difference in phosphate concentrations could well be due to remineralization of organic matter rather than diffusion from the sediments.

Specific Comments:

Page 6091, line 8: oxygen deficient WATERS

Lines 26,27: "Western Continental Shelf of India" already abbreviated in line 21.

Page 6092, line 3: Delete "closer"

Lines 19-20: Do these figures apply for the ECSI or the whole of Bay of Bengal?

Line 20: Low SALINITY water

Page 6093, line 10: Delete "terminal"

Lines 14, 15: Change to "except 8oN and 22oN, where samples were taken only during the LSM and SIM, respectively"

Page 6095, line 10: were ANALYZED for phosphate

Page 6097, section 3.1.2: Data from the ECSI are from only one season when upwelling-related hypoxia is not expected anyway.

Section 3.2: I am surprised by the seasonality in the composition of sediments. Changes in iron speciation are understandable as they may be regulated by the re-

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dox chemistry of overlying waters, but the sedimentary TOC and TON contents in the samples recovered by a grab are expected to be determined by processes that integrate over much longer time scales.

Page 6100, line 1: Pleistocene.

Line 17: LOW productivity

Page 6102, lines 11-18: The surface sediments examined in this study are of recent origin. I do not think the discussion of conditions during the Cretaceous is relevant here.

Page 6103, line 2: Change “both the” to “the two”.

Fig 2, Fig. 3 and Fig. 5: sapling points may be shown as in Fig. 4

Interactive comment on Biogeosciences Discuss., 7, 6089, 2010.