

***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 #1**

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1. The authors have collected surface sediments (0-1 cm) from the western and eastern continental shelf of India to study seasonal oxygen deficiency influence on phosphorus geochemistry. In this process, they have also re-visited the western continental shelf of India (WCSI) mainly to understand the influence of seasonal variations in hydrography (a period of six/seven months) on the geochemical behavior of solid phase speciation of phosphorus in surface sediments (0-1 cm). The basic question that rises is whether the top 1 cm would represent a period of changes which can take place in a period of six months. It is rather difficult to appreciate this as the published sedimen-

C2744

tation rates in the shelf region range between 0.56–19 mm/yr (Babu and Nath, 2005 and references therein; Bhushan et al., 2005; Rao and Wagle, 1997). One centimeter of sediment they studied would represent a sedimentation history of ~20 yrs if one considers the lowest sedimentation rate, but may correspond to sites with higher sedimentation rates. Higher sedimentation rates recorded in areas closer to river mouths. In view of lack of information on sedimentation rates in the areas they studied, it is difficult to agree with their interpretations. This raises further question as to whether the kinetics of diagenetic response of phosphorus in sediments to hydrographic changes in water column would be adequate in six months.

2. The second question is again about the interpretations of seasonality changes. The sediments are mainly from shelf region (water depths: 50 to 150m) and the continental shelf region is prone to alongshore currents and resuspension. Shetye et al. 1990 (J. Mar. Res.48, pp.359-378) have observed a 150 km wide southerly surface current in water depth of 50 m along continental shelf of western Indian margin during summer monsoon. The southerly surface current replaced northerly current during winter. The clay mineral studies of Rao and Rao (Cont. Shelf Res. 15(14); 1995; 1757-1771) have shown that the clay minerals delivered by the west flowing Indian rivers were distributed along the western Indian coast due to long shore currents and cross-shelf transport. Thus, ‘in situ’ nature of sediments which the authors are assuming may not be true unless they prove otherwise unequivocally.

3. The authors have adopted ‘a selective interpretation of data’, the main focus being on PFe fraction. Their data shows that only PFe fraction has responded to seasonal suboxic/hypoxia Why only the PFe fraction should respond, when other forms of reactive P would also respond. Earlier studies in the Arabian Sea (references quoted by authors) have shown a clear response of all the P-reactive fractions to the permanent suboxic conditions prevailing in the Arabian Sea. This needs an explanation.