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Interactive comment on "Benthic mineralization and nutrient exchange over the inner continental shelf of western India" *by* A. K. Pratihary et al.

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The paper by Pratihary et al. develops an experimental study on the benthic nutrient cycling from the inner shelf of Western India, by contrasting the response to two monsoon regimes (upwelling-favorable and downwelling-favorable) and the corresponding anoxic/suboxic conditions in the overlying bottom water. The paper describes in detail the environmental setting, the experimental setup, and also develops a comprehensive discussion on several aspects of nutrient cycling, fluxes, etc. and their coupling/ecological impact with pelagic processes, as primary productivity. The paper brings a valuable contribution to the understanding of the role of benthic nutrient cycling in coastal environments. Nevertheless some issues need to be improved on my understanding in order to be published in Biogeosciences.

Response: We thank the reviewer for his constructive comments. We will be taking care most of his comments in the revised manuscript.

(1) Question/ comment: A question for the validity of the research is the lack of replicates in each of the experiments. Actually the authors do not discuss this issue, or state why the non replication of the experiments is justified.

Answer: The incubations during both October and April have been replicated and the mean flux values with the standard deviation (mean flux $\pm$ SD) have been presented in the table 2. Exp.2 and Exp.3 have been considered as replicates because both are anaerobic experiments where O2 decreased progressively. Similarly Exp.4 and first 24 hour of Exp.5 were considered as replicates as both are done in aerobic conditions. Last 60 h of Exp.5 and Exp.6 were taken as replicates as both are done under anaerobic condition. Overall, both aerobic and anaerobic incubations have been duplicated and the average flux value ($\pm$ standard deviation) were reported (Table 2). The further reason for considering the above mentioned experiments as replicates is the statistically insignificant variation (ANOVA, $p>0.05$) in the exchange (release or consumption) pattern/trend and the consistency in the flux rates of

(i) NO3+NO2 between Exp.1 and Exp. 2 (Fig.3)

(ii) O2 between Exp. 2 and Exp. 3 (Fig.3)

(iii) NH4, PO4 and SiO4 between Exp.1, Exp. 2 and Exp. 3 (Fig.3)

(iv) NO3+NO2, NH4, PO4 and SiO4 between Exp. 4 and Exp. 5 (first 24h) (Fig.4)

(v) O2, NH4, PO4 and SiO4 between Exp.5 (after 24h) and Exp.6.

Overall, both aerobic and anaerobic incubations were replicated and the average flux values ($\pm$ standard deviation) were presented in the Table 2.

(2) Question/ comment: On this same point, the statistic tests that are used in the study are not explained in the methodology (the p-values are given but the tests are

not mentioned or described).

Answer: 1-way ANOVA was used for the statistical test. It will be mentioned in the materials and methods section of the revised manuscript.

(3) Question/ comment: On the other hand, the figures 5a-5c are good syntheses of the nutrient cycling seasonal changes. However while Figures 5a and 5c correspond directly with the two seasons under which the experiments were done, Figure 5b does not. I recommend to delete the months (April, June-July, October) from the captions in the figure, and include the interpretation of each experiment related to the seasonal signal very early in the Discussion. Then the figures legends should indicate the experiments that were used in each case.

Answer: As per the suggestion of the reviewer, figure 5b will be deleted in the revised manuscript. Figure 5a is based on the results of Exp.4, 5 and 6 which depicts the benthic exchange scenario during oxic regime i.e. in the month of April. Thus April was mentioned in the figure. Similarly figure 5c is based on the results of Exp.1, 2 and 3 which represents the benthic exchange scenario during anoxic regime i.e. in the month of October and that is why October was mentioned in the caption. The interpretation of each experiment related to the seasonal signal is given in the discussion. The months April and October will be deleted from the figure and the month will be mentioned in the figure caption with the experiment details in the revised manuscript.

(4) Question/ comment: Minor observations: Table 1: Consider to change it to a figure/diagram. Table 2: What are the errors for the measured fluxes? If they come from the fit tests, indicate that in the legend with proper explanation. Figures 5a/b/c. Standardize: sediment oxygen consumption or benthic oxygen consumption?

Answer: It will be difficult to express the Table 1 in figure form. However, the experimental details are also given in the methodology section. Thus we prefer to retain the Table 1 with more description.

The errors are expressed in terms of standard deviations which are given with the flux values. Flux values from the replicate experiments are considered. Each experiment gave a flux value and the mean flux value is presented with standard deviation. These will be mentioned in the caption for the Table 2.

The oxygen influx will be mentioned as ‘sediment oxygen consumption’ throughout the revised manuscript.

Interactive comment on Biogeosciences Discuss., 10, 9603, 2013.