Interactive comment on "Seasonal occurrence of anoxygenic photosynthesis in Tillari and Selaulim reservoirs, Western India" by S. Kurian et al.

By Dr. Abella

The paper deals with a first account of the occurrence of GPB in a couple of Indian Reservoirs in summer. I think that in the actual draft several changes must be made before the final acceptance for publication. The paper seen technically correct except in some aspects related to sampling of the water column with no annual cycle measurements.

Reply:
We thank Dr. Abella for his review which has helped in improving the manuscript to a considerable extent. Most of his suggestions have been taken into account while revising the manuscript. The detailed response to his comments is as follows.

Referee's comment
General Comments:
I think the authors exaggerate the importance and incidence of the paper taking in account the fact that no annual cycle has been performed or at least if as they say is sampled once a month since March 2010 L14 page 12156, where are the results? And in one case Selaulim Dam is only once sampled.

Reply: The Tillari Reservoir has indeed been sampled on a monthly basis since March, 2010. The detailed physico-chemical data set from this reservoir will be published elsewhere (Narvenkar et al., manuscript in preparation). For the purpose of this manuscript, we only use data when sulphidic conditions were observed to prevail in the reservoir and we carried out sampling for anoxygenic photosynthetic activity. The other reservoir (Selaulim) was sampled only once when sulphidic conditions prevailed. We also observed sulphidic conditions in a few other reservoirs although photosynthetic organisms were not studied. It is therefore quite likely that similar conditions also prevail in other freshwater systems in India. We have made suitable changes in the text in response to referee's observations.

Referee's comment:
I wonder, that as frequently happens in stratified lakes and reservoirs, if is possible that Purple Photosynthetic Bacteria were also present in upper layers but not found due to the sampling method used at 5 m each. Thinner microbial layers or plates could easily be missed.

Reply: We believe it is very unlikely that purple photosynthetic bacteria could have been missed entirely by us. Oxygenated conditions prevailed in the upper 10 meters of the water column in the Tillari Reservoir where purple photosynthetic bacteria could not have grown. We were very careful to sample the top of the anoxic zone where these bacteria are most likely to be found due to their preference for higher light levels than the brown sulfur bacteria. In the deeper layer light levels were probably too low for their growth. The BChl-*e* layer observed in this reservoir was ~25 m thick. While it is true that the microbial plate of purple photosynthetic bacteria can be very thin, there is always some mixing and sinking

of cells, which spreads the pigments vertically over the water column. BChls *a* and *b* are very distinctive, and hence we should have detected had they been present even at very low levels.

Referee's comment:
Don't confuse anaerobic microorganisms with anoxic conditions, don't mix up both concepts, don't say anaerobic hypolimnia (first phrase of Introduction) but anoxic hypolymnia.

Reply: This has been corrected in the revised manuscript.

Referee's comment:
In the discussion, eliminate speculative paragraphs. Check and review all the references because some are not stated at the end list for example: Narvenkar et al 2011.

Reply: Accepted.

Detailed comments:

Referee's comment
Introduction: Do not use the term "brown colored ones" better use "brown colored species"
Methodology: The Pfennig medium should be cited with the reference not the German collection link only.

Reply: **Accepted.**

Results: L5 page 12160 I don't understand the meaning of shoaled? Explain.

Reply: 'Shoaled' means 'to become shallow(er)'. Appropriate change has been made in the manuscript.

Referee's comment
L9 page 12160 you indicate the light irradiance at the surface and at the bottom but not the measurements at the layers of Phototrophic Bacteria. Please indicate and % in relation to the surface.

Reply: Light irradiance and % of surface incident light at the layers of phototrophic bacteria have been included in the revised manuscript under section 4.2, as their occurrence was mentioned after section 3.1.2.

Referee's comment:
L14 page 12162 says: dominance of photosynthetic sulfur bacteria, change to: brown sulfur bacteria as indicated by the presence of BChl e and isorenieratene (check your spelling)

Reply: Modification has been made in the revised manuscript.

Referee's comment

Discussion
Page 12163 line 5 you say: significant amount of sunlight (fig 3c). Indicate the exact% figure and depth.

Reply: **% of sunlight at 10m is specified in the text.**

Page 12164 L 16 I think provided that you don't give any further explanation of the distribution of homologues you better integrate the results in the water column.

Reply: In this section, the role of H_2S and % of surface incident light is being discussed. Integration of BChl e isomers and standing stock has been done in section 4.3.

Page. 12165 L 3 use Cb. Phaeobacteroides

Reply: Corrected

Page 12165 L8 precise the exact measured value of low incident light levels similar to those encountered in the present study.

Reply: Included in the revised manuscript.

Discussion is too speculative in the paragraphs when comparisons with other water bodies are made.

Reply: **Modifications made in the revised manuscript**

Fig 1. In the large map of India subcontinent, Sri Lanka has disappeared, please correct the geographical detailed map.

Reply: Map has been modified in the revised manuscript.

Give a table with the results of the sampling of Selaulim Reservoir.

Reply: Such a table is now included in the revised manuscript.