Reply to the Referee #1 comments

The authors are thankful to referee for his/her critical and constructive comments which helped in improvising the manuscript. The necessary changes in view of the comments made by the referee has been incorporated in the manuscript and would be send along with those as would be suggested by other reviewers. Here, we provide replies to the comments.

Comment: ***I found the data/results relatively straight forward but the results were slightly over-interpreted in conjunction with other datasets. I think part of the issue might be resolved in annotating the figures with specific intervals better (e.g. YD and BA).***

Reply: The biogenic silica flux has been primarily used as proxy to reconstruct the Somali upwelling with SST records as secondary/supporting proxy. The data has been compared with the long-term trend of available palaeoclimatic records and have been summarized to the most appropriate conditions prevailed in the region. As suggested, the B/A and YD intervals have been marked in the figures 5 and 6.

Comment: ***One of my major concerns is using TEX86 values as sea surface temperature in an upwelling region. TEX86 values record variable temperatures in upwelling regions (see Hertzberg et al., EPSL 2016). TEX86 essentially records subsurface conditions in upwelling regions so interpreting the Huguet et al., 2006 record purely as sea surface temperature is incorrect. I would recommend excluding this temperature record from the regional climate discussion. This would change the discussion section significantly. In particular, much of the YD and BA discussion hinges on the TEX86 record.***

Reply: We agree that the TEX^{86} proxy records surface or sub-subsurface sea surface temperature on longer time scales dependant on the nutrient availability and surface productivity. The suggested publication Hertzberg et al., EPSL 2016 from east pacific region indicates the TEX^{86} record co-vary with Mg/Ca SST during modern and Holocene, but differs during the LGM. However, our aim is to decipher the changes in SST with respect to the biogenic silica variation as recorded in the present study. Since we are not discerning quantitative changes in SST or the inconsistencies between various SST proxies, only the relative trend of increase / decrease in SST has been considered. Moreover, as seen in Fig.5, the Mg/Ca based SST record by Saher et al., 2007 also shows co-variance with minor amplitude. As suggested, we have modified the discussion accordingly.

Comment: ***For comparisons of specific events like the YD and BA, I have some concerns about the age models. Many of the regional records are relatively low resolution. Are the age models, and frankly the sampling resolution, adequate to make the regional interpretations for the YD and BA? I think annotating these specific intervals on the figures would help the reader and the authors evaluate these interpretations.***

Reply: The sampling resolutions of the studies discussed were sufficient enough to make comparison and interpret multi-millennial scale events like B/A & YD. Although, the age models of the discussed sediment cores are of low resolution, but reasonably high for events like B/A and YD, thus we have not attempted to compute any correlation plot between regional records. The B/A and YD intervals have been marked in the figures 5 and 6 as per referee's suggestion.

Comment: ***Could the authors clarify the selective preservation within the upwelling region (Lines 125-135)? In addition to the upwelling diatoms being more heavily silicified, presumably the flux of diatoms to the sediment during upwelling when nutrients are abundant also enhances their preservation? I'm not certain how the authors determined the preservation efficiency in the core. Is this based on the types of diatoms within the sediment?***

Reply: For determining the preservation efficiency of diatom in the core, we have used findings of previous study by Konning et al., 1997 and 2001 from the Somali basin, wherein preservation efficiency is based on sediment traps and surface sediment studies. They observed "two well-silicified upwelling species, T. *Nitzschioides* and the solution-resistant *Chaetoceros*, make up ~60% of the sediment, and dominate sediments both in the core tops and down core, thereby preserving a residual upwelling signal". The estimated preservation efficiency is derived from the productivity and type of diatoms preserved in sediments (Konning et al., 1997 and 2001). Detailed discussion has been incorporated in the manuscript.

<u>Minor Comments:</u>

Comment: ***Please refer the reader to the specific figure (or figures) within the text. Figures should be labeled with region (e.g. Western Ghats) in addition to the author.***

Reply: The suggested corrections have been incorporated in the text as well as in the figure captions of the revised manuscript.

Comment: ***Line 15: "positive to negative" is ambiguous. Could you make this sentence a little more clear?***

Reply: The suggested change has been made.

Comment: ***Line 25: SST not defined write out sea surface temperature***

Reply: Sea surface temperature is introduced at line 25 of the revised manuscript.

Comment: ***Lines 170-175: I think it would be best to start this line of argument with the colder SSTs in the LGP are related to global cooling and not a change in upwelling strength.***

Reply: The statement has been modified as suggested.

Comment: ***Line 175: use suggested instead of envisaged***

Reply: The change has been made.

Comment: ***Line 188: I don't see a reduction in temperatures during the B/A***

Reply: The B/A event marked between 15-13 ka BP shows prominent reduction in temperatures both by Anand et al, 2008 and Huguet et al., 2006, though, Mg/Ca SST by Saher et al., 2007 shows minor change comparatively. This is noticeable with B/A events marked in the comparison figures.

Comment: ***Lines 209-211: I don't see this pronounced SST decrease in the Mg/Ca SST records, this is a TEX signal?***

Reply: Thanks for the observation as there is no pronounced SST decrease in the Mg/Ca SST records, however, Mg/Ca SST record of Saher et al., 2007 indicates only a marginal decrease at the beginning of Holocene period. The amplitude in the SST change differs between Mg/Ca and TEX^{86} records, with latter showing prominent change. Necessary modification made in the text.

Comment: ***Lines 231-235: I would recommend omitting this impact statement.***

Reply: This statement has been made to highlight the significance of the present study. However, the statement being emphatic in nature has been toned down and appropriately modified as "The Somali upwelling can possibly have a negative impact on southwest monsoon rainfall over south-western India throughout the Holocene. This finding would have implications in context of the modeling study by deCastro et al. (2016), which shows that Somali upwelling would increase during the twenty-first century."