

## ***Interactive comment on “Seasonality in Planktic Foraminifera of the Central California Coastal Upwelling Region” by C. V. Davis et al.***

### **Anonymous Referee #2**

Received and published: 11 April 2016

The manuscript presents a recent 2-years monthly time-series of planktonic foraminifera assemblages off Central California, across a gradient from the coast into the upwelling. The assemblage dynamics is compared statistically with a set of hydrographic parameters, to infer the ecology of the different species. The main conclusions emphasize the effect of upwelled waters on the species assemblage, and among them, the authors underline *G. bulloides* as a peri-upwelling species, an interesting finding in my opinion. The manuscript is generally well written, well structured and a pleasure to read. The figures are generally OK, though might be improved to convey the main message of the paper more efficiently (see below). I also would like to have the authors to publish their datasets (hydrographic and faunal), either in a repository or in a supplementary table.

General comments :

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Generally, as the paper deals with the assemblages all the conclusions sound conclusive. However, I am not convinced by the absolute abundance analysis of the foraminifera, as there is no indication of the volume filtered (though the authors seem to have some rough ideas). For example on Figure 7, the total number of foraminifera will depend of the filtered volume, which is dependent on the depth (25 m for BL1 vs 200 m at BL5), the duration of the tow, the currents, and the clogging of the nets. So I would be very careful in analyzing the patterns in total numbers of foraminifera. As this is not the main findings of the manuscript, I would suggest to move those informations in the supplementary material because they can be useful, though without any of the above parameter above, it will be difficult to interpret. This is also the case for the lunar cycle analysis, Figure 7, which does not show the breakdown by station, and thus could also be interpreted as a migration of the upwelling core during the lunar cycle.

The second objective of the manuscript is to document the link with high frequency changes in the water dynamics, and I am not sure this issue is really dealt in the paper.

The manuscript has a side focus on acidification, yet the carbonate system data are not shown anywhere in the figures nor in tables. Adding a panel on Figure 4 would be helpful to get a sense of the gradient. Moreover, the idea that acidification/lower omega is systematically associated to lower calcification/shell weight has been shown not to be the case for *G. bulloides* in the Arabian Sea [Beer, C.J., Schiebel, R., Wilson, P.A., 2010. Testing planktic foraminiferal shell weight as a surface water [CO<sub>2</sub>] proxy using plankton net samples. *Geol* 38, 103–106. doi:10.1130/G30150.1.], and thus, even if the manuscript deals on the resilience to acidification rather than the direct effect of acidification on calcification, it might be interesting to have both perspectives in the final paper.

The manuscript would benefit of the addition of a short paragraph describing the taxonomic rules used to differentiate *N. incompta* from *N. dutertrei* and *N. pachyderma*. Are the authors using *N. incompta* as *N. pachyderma* right coiling (sensu Darling et al. 2006) or are they using the former rule of intermediate forms between *N. dutertrei* and

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pachyderma (N. eggeri) ?

The statistical analysis needs to be further documented : the matrix output of the PCA analysis (eigenvalues) would be very helpful. Which software was used ? - I also have some difficulties to understand the rationale for the two step PCA analysis as it just gives more variance to the selected set of species.

I wonder what is the impact of the very few stations with high abundances : on the supplementary plate, most of the trends, seem to be forced by a very limited set of nets : eg for incompta, removing the samples with an abundance higher than 100 would likely collapse all the trends derived.

Minor comments : Raw data should be deposited on a permanent data repository or added in supplementary material as a table.

Technical comments : p2 l.20 : add the approximate location of station Papa p3 l. 20 : what is special in the California upwelling that it makes it “unusual”-ly sensitive to acidification. My sense is that is the most studied upwelling, but I cannot see any reason why it would be different in other upwelling regions. p6. l22 : what does TRIS stand for ? p11 l. 9-10 : to be consistent with the hydrographic description during upwelling season, please give the omega value . p12 l. 9 : correct sinistral p.14 l. 10 : change Globigerinoides by Globigerina Figure 1 : please change the labels of the stations of the map to BL as in text or figure caption. Figure 2 : it would be helpful to add the timing of the different tows on this figure with two different sets of ids for BL and ACCESS stations. Figure 3, right panel : correct quinqueloba Supplemental figure : please add in X-axis the unit (# of forams ?) ; add a caption What is the unit for fluorescence in the supplementary plate ? - note that usually a calibration can transfer the fluo signal in chlorophyll concentration, as fluo measurements are highly dependent of the sensor used (and its maintenance).

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Interactive comment on Biogeosciences Discuss., doi:10.5194/bg-2015-626, 2016.

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