Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2017-497-RC1, 2017

Biogeosciences
Discussions

Interactive comment on "Physico-chemical and biological factors influencing dinoflagellate cyst production in the Cariaco Basin" *by* Manuel Bringué et al.

B. Dale (Referee)

barrie.dale@geo.uio.no

Received and published: 14 December 2017

Dinoflagellate cysts are increasingly used for marine paleoenvironmental interpretations, based on "cyst signals" recognized from studies of cyst distributions in the present-day ocean. These include signals for dissolved nutrients, SST, salinity, and distance from shore, largely developed by comparing cyst assemblages in surface sediments with environmental conditions in correspondingly overlying surface waters. The accuracy of signals inferred from such comparisons is dependent on the level of our understanding of which cysts are formed where and when in the ecological system. There are obvious limitations to simply comparing cysts in bottom sediments

with overlying surface water: cysts may be transported significant distances from their point of origin in the plankton prior to being deposited in the sediment (especially in deep oceanic or otherwise turbulent waters), possibly obscuring evidence of where they were formed; the age of cysts in bottom sediments is dependent on rates of sedimentation, potentially obscuring when the cysts were formed. The hydrographic data available for comparison with the sediments are of varied quality. Sediment traps as deployed here can provide more plausible information, while also recognizing certain limitations to this approach, too, as the authors do. By choosing the upper trap of this array (at 275m), should reduce the possibility for long-transport of the cysts sampled, and the succession of cup- collections is expected to show the approximate time of cyst formations in the upper water mass. The series of hydrographic data collected at the same station and times should allow close cyst/environment comparisons. The results produced seem to confirm a by now well established nutrient signal with heterotrophic species dominating the cyst signal with increased nutrients from upwelling – with some interesting first suggestions of nuances involving different species with differing degrees of upwelling. This is excellent work that pushes our understanding a step further by suggesting when and where the reported cysts may have formed, allowing this to be correlated to the corresponding environmental parameters, in at least this one location. Furthermore, including data for other plankton groups has allowed some suggestions of possible links to the very complex marine food web. This work sets the bar high for the many more such studies that will be needed to increase our understanding of just how precise the cyst signals may be. As a reviewer, I could wish that more studies were as well designed, carried out and reported as this, and the authors are to be congratulated. The only possible improvements I could suggest for the paper would be to indicate any currents affecting the water entering the basin (possible cyst transport?), and to indicate if possible what proportion of the cysts trapped had "fresh" cell contents. Our experience with sediment traps is that cell contents may be good indicators of "newly-formed" cysts. The authors perhaps wisely avoid serious attempts to relate this evidence from one trap depth to the bottom sediments that form

the broader reason for carrying out such studies, but I hope they will continue to investigate the lower trap samples eventually to see how accurately the cyst signal they identify is translated into the sediment.

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