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Ocean Science Discussions

Interactive comment on "Molecular biology techniques and applications for ocean sensing" *by* J. P. Zehr et al.

Anonymous Referee #2

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Zehr and colleagues have provided an overview of the molecular (DNA/RNA)-based tools that have been adapted from the medical research field and applied to understanding oceanic ecosystems. They provide a broad overview of the currently used techniques and methods, and define some of the challenges we face as a community in converting these tools into real-time in situ applications. This review provides an up-to-date snapshot of a field in which the technology is rapidly evolving and is a good introduction to the techniques used in marine molecular biology that is likely to be of use to a student or non-specialist.

Specific comments:

1) It is perhaps beyond the scope of this review, but readers should be made aware of

the use of protein-based methods that are being applied in the field of oceanography. Zehr et al highlight some of the issues relating to probe binding efficiency (PCR bias) that may be overcome using proteomic approaches (which again have been developed for medical applications).

2) Another challenge that could be stressed in this review is the need to know the microbial diversity of a community before many of the approaches listed can be applied. Many of the techniques listed rely on development on cultured organisms, which may not be representative of the real environmental community (Azam et al 1998). The Shot-gun cloning / metagenomic approaches will often need to be conducted prior to any sensor development for this reason.

3) Owing to Zehr’s background in understanding nitrogen-fixation, some other examples could be used for the application of molecular techniques in oceanic systems e.g. phosphate metabolism, calcification etc.

4) On page 644 the authors stress the need to define ecosystem targets – are these molecular or geographic? Will well-characterised oceanic regions such as BATS and HOTS be candidate locations for sensor development?

Interactive comment on Ocean Sci. Discuss., 5, 625, 2008.