

# ***Interactive comment on “Transfer of diazotroph derived nitrogen towards non-diazotrophic planktonic communities: a comparative study between *Trichodesmium erythraeum*, *Crocospaera watsonii* and *Cyanothece* sp.” by H. Berthelot et al.***

## **Anonymous Referee #1**

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This study examined the fate of nitrogen fixed by three major cyanobacterial diazotrophs (*Trichodesmium erythraeum*, *Crocospaera watsonii*, *Cyanothece* sp.) in the tropical and subtropical oligotrophic regions by microcosm experiments. Nitrogen transfer from individual diazotroph groups to the host organism or non-diazotrophs in the ambient water has been examined (Lee Chen et al., 2011; Foster et al., 2011; Krupke et al., 2015), however, this kind of comparative study is lacking. Therefore, if the finding in the present study is true, it will be of interest to the journal’s readership.

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The focus of the paper is well phrased, and the manuscript is well written. However, the authors should make clear the following points before the publication.

The authors evaluated fixed N and N transfer from  $^{15}\text{N}$  signal at the cell surface. This analysis would not be examined fixed N inside the cell. The authors have to justify their “quantitative” analysis especially in this kind of comparative study. Otherwise, their conclusion is not very convincing.

Ammonium concentration is generally depleted in the oligotrophic ocean because it is rapidly consumed by microorganism as soon as it is released (Brzezinski, 1988). The authors should show the detection limit of ammonium concentration in their analysis of  $^{15}\text{N}$ -ammonium. Further, they should show ammonium and DON concentration in each experiment in the table.

Why was the fixed N transferred mainly towards pico-planktonic communities? In general, when light and nutrient are sufficiently supplied, diatoms are capable of growing more rapidly than cyanobacteria (Miller and Wheeler, 2012).

Specific P21 L2-4 How did the authors calculate the cell-specific  $\text{N}_2$  fixation by using a nanoSIMS? Please write more detail.

P26 L16-21 Bonnet et al. (2015b) is unpublished paper, and thus I cannot evaluate this discussion.

Reference Brezezinski, M.A. (1988) Vertical distribution of ammonium in stratified oligotrophic waters., *Limnol. Oceanogr.* 33(5), 1176-1182. Krupke, A., W. Mohr, J. LaRoche, B.M. Fuchs, R.I. Amann, M.M.M. Kuypers (2015) The effect of nutrients on carbon and nitrogen fixation by the UCYN-A-haptophyte symbiosis., *ISME J.* 9, 1635-1647. Miller, C.B., P.A. Wheeler (2012) Chapter 3 Habitat determinants of primary production in the sea. In: *Biological Oceanography*, Second Edition, John Wiley & Sons, Ltd.

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