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Interactive comment on "Intact polar lipids of Thaumarchaeota and anammox bacteria as indicators of N-cycling in the Eastern Tropical North Pacific oxygen deficient zone" *by* M. Sollai et al.

Anonymous Referee #1

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General comments

Microbial ecology associated with the expanding oxygen minimum zone has a crucial impact on the global nitrogen and carbon cycles. AOA and anammox are two key components of the metabolic processes of nitrification and denitrification. Using lipid biomarkers this manuscript discussed the distribution and potential interaction of AOA and anammox in two different sites of ETNP. Both chemistry and lipids data are very well presented. The distribution of Thaumarchaeota and anammox bacteria in the water columns indicated by the lipid profiles is convincing, and consists with other

previously reported data. Indeed, it is shown that these two kinds of microbes are more sensitive to oxygen content rather than nutrients.

What I am concerned is whether the somehow overlapped crenarchaeol and ladderane profiles in the open ocean site really represents an actual interaction between the AOA and anammox communities. At the coastal site the ammonia spike close to oxycline must have stimulated the growth of Thaumarchaeota, while anammox bacteria is more restricted to nitrite. Therefore, under a suitable oxygen condition these two communities are divided by their favorite nutrients. The nitrite peak in the middle of OMZ is likely not related to AOA. Their overlap at the open ocean site with constant low ammonia concentration is more constrained by oxygen content. The direct metabolic link or network between Thaumarchaeota and anammox bacteria seems really weak. Other species involved in the nitrogen metabolism are probably more closely interacted with either one of them.

Specific comments

1. Introduction: A N-cycle diagram showing the metabolic feature of AOA and anammox will be straightforward.

The front of 'Thaumarchaeota' does not need to be in italic.

2.2 Sampling: Station names in Table. 1 and Fig. 1 are not consistent. "147-149" is labeled as "147" in Fig. 1. And, "106" is missing in Table 1.

2.3 Intact polar lipid analysis: It is ok to show the relative abundance of HPH-crenarchaeol with peak areas, but as I know, the response factor of a given compound may also vary due to instrument condition in different times. Did you analyze all your samples in the same batch?

Results: 3.1 please give a brief statement why water density is so different at the two studied sites. . . ..Salinity?

Please explain the unite (r.u. L-1) of HPH-crenarchaeol, and the same as in Fig. 3.

BGD

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Discussion: P4845, lines 9-11, At the coastal site there is low ladderane concentration detected at the oxycline, first three data points in Figure 2f. There is also typo in this sentence, please rewrite.

P4848, lines 5-13, Terrestrial input could be the main cause. A more detailed discussion will be better.

Figure caption, What do the yellow shades in Fig. 2 represent?

Interactive comment on Biogeosciences Discuss., 12, 4833, 2015.