General comment

N2O is one of the most important greenhouse gases, and the ocean plays an important role it the global budget. The production of this gas in the water column will be boosted at low oxygen concentration but consumed when the oxygen concentration drop to certain criteria. Therefore the water with low oxygen concentration is generally important source for N2O. Base on the information provided by the authors. The Baltic Sea is good spot for N2O biogeochemical cycle study in the low oxygen concentration, and the authors use state-of-the-art technique such as isotopemer analysis to reveal the possible N2O production, which will of course promote our understanding of the N2O dynamics in this study region. Unfortunately, I think there are some major issues in this manuscript, and I think the author should make more effort to revise it before it is acceptable for the Journal. One of my biggest concern is that the authors divide the water column in two types of water, oxic and suboxic, and the suboxic water also divided in two groups bases on whether or not there is sulfide detectable. However, I can't not tell is this a reasonable way since the there are very limit information for the dissolve oxygen distribution patterns in the study section, only section with small figure in figure 2a, and a station profile figure 2b. However, from Figure 2 and Figure 3, I suppose that there may be annoxic or oxygen-deficient layer presented in the study region. So, the concentration of oxygen should be clearly displayed, and better categorized, this will provide some very important information for the readers. Secondly, I think the manuscipt lacks figure of hydrographic parameters such as temperature and salinity, since the authors mentioned the hydrographic process such as MBI, and it may provide some important information such as the the authors mentioned in the manusript, like, how the oxygen "intrude" the region. Finally, as a whole, I don't think that the authors give the readers a very clear and solid conclusion, there may be many reasons lead to this situation, including poor preparing of the figure, which in turn lead to incomplete description of phenomenons, and skill of writing, which stop the authors from well describe the phenomenon, and so on. Hence, I think that the authors should carefully reanalysis the dataset, redraw the figures and reorganized

the logic and language of this manuscipt. A major revision is needed before the paper is suitable for publication by the journal.

Specific comment

Line 55, signature of the nitrate or nitrite... I think reference is needed here.

Line 69 5-15nM..., if this is general range, I suggest a wilder range since the polar ocean may have higher N2O concentration

Line 75-81 for the first question, I feel there is inconsistent with last paragraph. In the last paragraph, it seems there are colleauges concluded that nitrification is the predominated N2O source, whereas the authors want to answer the dominant pathways, any new insight we can obtain in this study?

Line 82 this Manuscipt is not a methodology paper, so I think this question is put forward inappropriate here, if the authors is not confident to use the method here, they should carry out a study to estimate of effectiveness of this method in advance.
Line 130 Is this means that the sample is bubble free before capping, generally, when butyl stoppers and aluminium crimps was capped, it will easily introduce bubble, so i guess bubble free should be make sure after capping?

Figure 2. as mentioned before, hydrographic figures should be provided here, and the oxygen profile of each stations should be added to figure 3

Line 174 O2 between 9-2umol? Typo?

Figure 3, the scale of x y axis of each figure should agree with each other, so it is easier for the reader to compare them.

Line 229 “Significant” is a word used only after statistic data analysis performed, it generally should followed with a criteria such as p value

Line 264 I think the first sentence should be rewritten

Line 396 the conclusion should be rewritten, there is no solid conlusion in current format, for example, the sentence “our results demonstrated the spatial variability...” what kind of variability? Moreover, half of the paragraph is about future work, generally, it will only be one or two sentence for future work