Biogeosciences Discuss.,
https://doi.org/10.5194/bg-2018-453-RC3, 2019

Biogeosciences Discussions
Open Access
EGU

Interactive comment on "Investigating the effect of El Niño on nitrous oxide distribution in the Eastern Tropical South Pacific" *by* Qixing Ji et al.

Anonymous Referee #4

Received and published: 12 January 2019

p. 1 lines 19-24: The deepening of the oxycline and deeper N2O peaksâĂŤis this just due to a deepening of the isopycnal they occur on, or are they shifting to different density surfaces?

p. 3, lines 19-25: Additional detail on analysis and calibration of N2O isotopologue measurements should be provided.

p. 4, Equation 5: definition of SP should not have the multiple of 1/2.

p. 6, lines 17-18: how do you interpret the SP values < 0, especially in the surface which should likely be closer to atmospheric values (∼18‰?

p. 7, equation 6: I understand that you are using an end member mixing, or 'Keeling Plot' model for estimating the d value of the produced N2O, but it was less clear how

Printer-friendly version

Discussion paper

you then attribute the N2O source based on those values. Please provide additional information, support, justification for the source attributions based on your measurements and calculations.

p. 7, lines 27-28: it seems difficult to explain a SP value of -9‰ under these conditions. I would be concerned here about calibration, and believe that the authors should further discuss their calibration techniques, and possible explanations for such a low SP value in surface waters.

p. 8, line 1: Is there any other evidence of upwelling/diffusion from suboxic zones influencing the upper water column here?

p. 8, lines 19-22: It is not meaningful to apply the model in equation 6 to an environment in which N2O is being consumed. Is there any evidence of N2O production here, or only consumption?

p. 8, line 28: Are you excluding nitrifier-denitrification here, or lumping it in with 'denitrification'?

p. 9, lines 1-3: How would you derive N2O production rates from nitrate and nitrite isotopes?

p. 10: I thought the discussion of El Nino effects on N2O was interesting, and wondered to what extent the sampling period represented conditions during the 2015 El Nino event, and how the 2015 El Nino event might reflect other El Nino events in this region. How broadly applicable are the current results?

Figure 1: Why are these years/data in particular the ones compared in this figure? It seems more relevant to compare the strength of the 2015 to other strong El Nino years to gauge how representative were the conditions sampled here of other El Nino periods.

Figures 3, 4, 5, 7: These section plots are not a particularly effective way to present the data. I understand the desire to present the data in a spatially explicit fashion, but the

section plots, with only a few stations, rather large gaps in the data, and considerable smoothing don't help to relay the information to readers. In many of these cases, stacked depth profiles would be a much clearer way of presenting the patterns and comparing to other existing data.

Interactive comment on Biogeosciences Discuss., https://doi.org/10.5194/bg-2018-453, 2018.

Printer-friendly version

Discussion paper