

Interactive comment on “A multi-year observation of nitrous oxide at the Boknis Eck Time-Series Station in the Eckernförde Bay (southwestern Baltic Sea)” by Xiao Ma et al.

Anonymous Referee #2

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Quantifying the concentrations and dynamics of dissolved N₂O in seawater is important for understanding the climate change, but conducting measurements of sufficient duration to determine trends over seasonal, interannual, and decadal time frames for any marine ecosystem remains a challenging task. A long-term Time-Series Station like Boknis Eck in the Eckernförde Bay can provide invaluable information for documenting the role of oceans in relation to N₂O, hence this type of study is significant for our scientific understanding. The paper is well-written and clear. I only have few comments/suggestions below: Lines 95-96: more information is needed on seawater sample collection. Lines 108-109: The N₂O concentration of standard gases should be provided. Line 154-155: ...dry mole fractions of atmospheric N₂O at the time of

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the sampling. This description is not the fact since atmospheric N₂O at the time of the sampling has not been measured and the monthly average of N₂O data measured at Mace Head was used to N₂O_{eq}. Lines 185-193: NH₄⁺ concentrations should be provided in the text as well as Figure 2. Lines 221-222: The expression caused misunderstanding. Lines 239-243: Does N₂O correlate with NH₄⁺? Line 462: The year of 2015 should be 2005? Line 476: There is no temperature data provided at all in this study but with a conclusion 'Temperature plays a modulating role for the N₂O emission at the BE Time-Series Station'. I suggest to provide t data in Figure 2 and more t data provided in related discussion in the text Figure 2: It would be better for the authors to provide the vertical profiles of t, s, density, NH₄⁺ and Chl a. Figure 6: The vertical profiles of hydrological parameters, such as t, s and density are needed to help understand the possible influence of physical processes on N₂O distribution as discussed between lines 301 and 309. Figure 8: title is needed for x- and y-axis at figure b and d Figure 9: title is needed for x- and y-axis

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