

Interactive comment on “Effects of the 2014 Major Baltic Inflow on methane and nitrous oxide dynamics in the water column of the Central Baltic Sea” by Jukka-Pekka Myllykangas et al.

Anonymous Referee #1

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The manuscript "Effects of the 2014 Major Baltic Inflow on methane and nitrous oxide dynamics in the water column of the Central Baltic Sea" by Myllykangas et al. presents measurements of N₂O and CH₄ in the deep waters of the central Baltic Sea during an inflow event of saline, oxygen-rich waters.

The manuscript presents valuable insights into the dynamics of N₂O and CH₄ accumulation and depletion in the water column as a consequence of water column oxygenation and subsequent reestablishment of anoxic conditions. The high temporal resolution of the samplings allows a comprehensive reconstruction of the N₂O and CH₄ development and the processes influencing their distribution.

The manuscript is generally well structured and written and I can support its publication

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with only minor corrections:

P. 2, lines 15-17: I would emphasize the role of oxygen on N₂O production and consumption processes. Given the fact that oxygen concentrations show strong gradients and a large variability during the Major Baltic Inflow event, the sensitivity of N₂O production of nitrification and denitrification should be discussed more detailed.

P. 3, lines 16-17 & P. 4, lines 1-4: please explain in more detail how the samples were drawn from the Niskin bottles and transferred into the Exetainers. Were the syringes directly connected to the Niskin bottles? How was the system flushed to enable bubble-free sampling of the Niskin bottles? How exactly were the samples transferred to the Exetainers and how was air contamination prevented?

P. 4, line 23: Equation (1) is not entirely correct: P_{atm} in the first term of the equation has to be given in Pascal since this term represents the ideal gas law.

P. 9, lines 14-15: please add Löscher et al. (2012) as a reference for the oxygen-dependency of N₂O production by nitrifying archaea: Löscher, C. R., Kock, A., Könneke, M., Laroche, J., Bange, H. W. and Schmitz, R. A.: Production of oceanic nitrous oxide by ammonia-oxidizing archaea, *Biogeosciences*, 9(7), 2419–2429, 2012.

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