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Interactive comment on "Equilibrator-based measurements of dissolved nitrous oxide in the surface ocean using an integrated cavity output laser absorption spectrometer" *by* I. Grefe and J. Kaiser

Anonymous Referee #1

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Studies of N2O emissions from oceanic areas were limited so far to discrete and labour intensive techniques. The development of oa-ICOS instruments in combination with an equilibration system allows a significantly larger spacio-tempral resolution of N2O in surface waters, which should improve the N2O emission estimates from oceanic areas. The presented manuscript shows N2O concentrations and N2O emission estimates of surface water measurements of a meridional Atlantic Transect. The topic and data are well prepared and discussed. I recommend the manuscript for publication at Ocean Science after the consideration of some minor comments.

Comments:

1) P.1036 L. 1 "The equilibrator. . ." sentence unclear. Please rephrase. 2) P.1037 L. 17-19 Referring to the temperature dependent solubility of N2O in seawater temperature probes with a precision of 0.01°C are recommended. 3) P.1037 L. 27 "Dried air with 323.7nmol/mol. . ." Please specify gas phase by adding N2O? 4) P.1038 L. 21 "where u is wind speed at 10. . ." Please add m. 5) P.1038 L. 23 Did you consider Wanninkhof 2010? 6) P 1039 2.3 You introduce a new method for N2O measurements in surface waters. The comparison to conventional methods like GC-MS measurements remains very short with only 3 CTD samples and no data shown and should extended. 7) P. 1042 L. 4 "relaxation time (=3t). . ." t = τ? 8) P. 1042 L. 5 "increased t to. . ." t = τ? 9) P. 1042 L. 6 "the value for t. . ." t = τ? 10) P. 1044 L. 6 "It was difficult to keep the water flow through the equilibrator. . ." You mention the use of a seawater flow regulator in the summary. Why was the regulation of a stable water flow through the equilibrator still an issue? It significantly influences the N2O measurements. 11) P. 1044 L. 24 Why is the coherence of upwelling and N2O values not shown via correlation with oxygen values or temperature for verification?

Interactive comment on Ocean Sci. Discuss., 10, 1031, 2013.