Biogeosciences Discuss., 12, C7774–C7775, 2015
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Biogeosciences Discussions

Interactive comment on "Isotopic evidence for biogenic molecular hydrogen production in the Atlantic Ocean" *by* S. Walter et al.

Anonymous Referee #2

Received and published: 18 November 2015

General comments

An increasing interest in hydrogen (H_2) as an alternative energy source is highlighting the need for a better understanding of the global H_2 budget and the magnitude of source and sink reactions. H_2 is a by-product of nitrogen fixation, an important source of bioavailable nitrogen in the ocean. The isotopic composition of atmospheric and marine dissolved H_2 can be a useful tracer of biological and chemical cycling in the environment. The authors present a dataset of atmospheric and marine H_2 concentrations and isotopic composition from the Atlantic Ocean, covering both hemispheres and different seasons. Open ocean data is compared to coastal measurements from the Mauritanian upwelling region. Of particular interest are the isotope measurements, confirming biological production as a major H_2 source in warm surface waters. The

manuscript is well written with a good presentation and discussion of the results. I recommend publication with some minor corrections.

Specific comments

p. 16441 l. 16-17: How exactly was the value of 92 % for the extraction efficiency determined? Is this a mean for all samples? What was the variability for the whole dataset?

p. 16448 l. 13-15: Please detail planned/recommended improvements and expected impact on measurements.

p. 16452 l. 21: Is the global nitrogen fixation rate of 175 TgN a^{-1} a result from the GEMS database?

Table 2: Why were samples excluded? Were there any issues with the sample handling or contamination?

Technical comments

Consider reporting saturations in % instead of saturation factors/supersaturation throughout the manuscript to facilitate comparison with other publications.

Table 4: Caption differs from table headings for χ_h /χ_m, $D_a/\delta D_a$ and $D_h/\delta D_m$.

Supplement p. 2: Format citation for Green Carritt, 1967, add full reference to supplement.

Supplement p. 4: Add full reference for Knox et al., 1992.

Interactive comment on Biogeosciences Discuss., 12, 16431, 2015.