

Interactive comment on “Air/sea DMS gas transfer in the North Atlantic: evidence for limited interfacial gas exchange at high wind speed” by T. G. Bell et al.

Anonymous Referee #2

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The manuscript presents a very interesting data-set and explores the influence of sea-state on gas transfer. Particularly since currently direct measurements of highly soluble gases are still scarce, the measurements of DMS gas transfer in the North Atlantic reported by Bell et al. are very important.

The air/sea transfer of DMS is relatively insensitive to bubble-mediated gas transfer. Hence, direct measurements of such fluxes are ideal for gaining insights into transport due to interfacial turbulence induced by waves. As has also been reported previously, the authors demonstrate that purely wind-speed dependent parameterizations of gas-transfer are ill-suited for the transfer of high solubility gases. Bell et al. also give a

C6016

reasonable explanation for this. It is a pity that directional wave spectra, surfactants and turbulence have not been measured during the campaign as this would be important data to verify the discussion of this manuscript.

A number of effects speculated on in this manuscript can be verified in laboratory measurements. Particularly the effect of waves on interfacial turbulence and on gas transfer have been studied under such conditions. For example, the effect of nonbreaking waves have been reported by [1] and a number of measurements have been conducted using thermographic techniques by different groups. Such efforts could be mentioned in the manuscript. Particularly thermography seems to be an ideal tool for linking interfacial turbulence to the DMS measurements reported here. Similarly to the direct measurements of DMS, thermography is not affected by bubble-mediated transfer.

Summing up, this manuscript is well written and raises a number of interesting and timely questions.

[1] I. B. Savelyev, E. Maxeiner, and D. Chalikov, “Turbulence production by nonbreaking waves: Laboratory and numerical simulations,” *J Geophys Res-Oceans*, vol. 117, no. 6, p. C00J13, 2012.

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