

## ***Interactive comment on “Attribution of Atmospheric Sulfur Dioxide over the English Channel to Dimethylsulfide and Changing Ship Emissions” by Mingxi Yang et al.***

### **Anonymous Referee #2**

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This manuscript presents an important dataset that explores the contribution of shipping to atmospheric sulphur dioxide concentrations on the English Channel coast. I recommend that the authors consider revision in respect of the following points before publication.

1. The change in SECA regulations in January 2015 involved a 10-fold reduction in the maximum sulphur content of bunker fuel. However, the abstract (lines 14-16) states that a threefold reduction in SO<sub>2</sub> emissions was observed, and that there was a high level of SECA compliance in 2015. The differing factors of 3 and 10 are not discussed: the reason becomes clear from Figure 10, which shows that many ships were already complying with the 2015 regulations in 2014. This point should be clearly made in

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order to avoid confusion (also in the Conclusion, p11, line 24).

2. p2, lines 24-25: needs rephrasing, e.g. “These regulations aim to reduce sulphur emission tenfold in SECAs by reducing the maximum allowed sulphur content of fuel from 1% to 0.1% by mass.” The later sentence on open ocean regulations should also make clear that the percentages apply to the sulphur content of bunker fuel. It could be worth mentioning here that the SECA regulations allow ships to use scrubber technology as an alternative to low-sulphur fuel: the mention of scrubbers on p8, line 26 is otherwise mysterious to the uninitiated.

3. p5, line 20: in Figure 4, the sector with few mixing ratios over 0.5 ppb in 2015 is southwest, not southeast.

4. p5, line 29 – p6, line 1: Why not use the same months in both years for this averaging?

5. p7, line 9: Liss and Slater (1974) state that both the hydration and the subsequent oxidation of SO<sub>2</sub> are rapid, but they gave no reference to the oxidation kinetics. It may well be that rapid hydration is enough to justify the assumption of near zero concentration of dissolved SO<sub>2</sub>. This point should be discussed more fully. Rate constants for the kinetics of sulphite oxidation can be found in Zhang and Millero (*Geochim. Cosmochim. Acta*, 57, 1705-1718, 1993).

6. p11, line 1: It is not clear what reductions are being discussed, in particular how does a reduction in 2014 arise?

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