

## ***Interactive comment on “Ship impacts on the marine atmosphere: insights into the contribution of shipping emissions to the properties of marine aerosol and clouds” by M. M. Coggon et al.***

### **Anonymous Referee #1**

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#### General comments:

This paper presents an investigation of the impact of ship plumes on aerosol and cloud-water chemistry using airborne measurements on the CIRPAS Twin Otter. This is a very relevant field of study both from an atmospheric composition and cloud microphysics perspective, as shipping emissions are known to affect both. The authors find evidence for the production of both sulphate and organics in the plume and identify novel mass spectral markers. The authors focus solely on the observations and concentrate more on making sure these stand up to scrutiny, rather than attempting to over-analyse the implications of these results. However, it is perhaps a little disappointing that they can-

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not propose a chemical source for the new marker peaks. Regardless, this is a very comprehensive and well-written paper and I have no hesitation recommending this for publication. I only have a few very minor comments that should be considered:

#### Specific comments:

Given that the exact chemical source of the  $m/z$  42 and 99 ions is not identified, I would be a little more conservative with the conclusions, especially seeing as these have not generally been reported in previous studies and shipping emissions are already known to be highly variable. I am not suggesting that the apportionment work in this paper be taken out, but rather than propose it as a universal tracer, I would say that this warrants further investigation to assess their suitability as tracers.

The authors should give more extensive and quantitative examples from the literature (beyond McInnes et al.) of what could be considered 'clean marine'. While this is covered in table 1, the results are presented in a purely qualitative manner, so are not much use in this context. It should also be noted that a number of studies have reported organic matter in clean marine environments in addition to sea salt and DMS-derived aerosol.

#### Technical comments:

Page 14408, Line 19: The term 'LV-OOA' was coined in Jimenez et al. (2009). Ulbrich et al. referred to this component as OOA-1, as no direct volatility data was available for that study.

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