

## ***Interactive comment on “Biogenic halocarbons from the Peruvian upwelling region as tropospheric halogen source” by H. Hepach et al.***

### **Anonymous Referee #2**

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#### General Comments

This manuscript by Hepach and co-authors presents gas-phase and oceanic observations of halogenated VOCs, including  $\text{CHBr}_3$ ,  $\text{CH}_2\text{Br}_2$ ,  $\text{CH}_2\text{ClI}$ ,  $\text{CH}_3\text{I}$ , and  $\text{CH}_2\text{I}_2$  from a ship cruise in the eastern tropical Pacific Ocean. In addition to the concentrations and sea-air flux calculations, the analysis includes correlations to phytoplankton groups measured in the surface water along the cruise path. The paper is reasonably well written and the many of the data presented are new observations. The paper should be published in ACP after addressing the following minor corrections.

#### Specific Comments

Page 5, line 2 – Three hourly is not explicit – every three hours, or three samples per hour? And was this day and night? What were the samples taken in? I would like to

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see a little more detail, even though the system was described in another paper.

Page 5, line 7 – replace “lay” with “was”.

Page 5, line 9 – “set up problems” sounds odd. Perhaps “instrument issues?”

Page 5, line 10 – 20 m “above sea level?” How were these samples stored? Stainless canisters? Glass flasks?

Page 5, line 11 – “starting on December 1...”

Page 5, line 23 – replace “build up” with “comprise”

Page 5, line 26 – “a” should be italicized.

Page 7, line 20 – The authors explain that they do not include detailed tropospheric iodine chemistry, and specify what they, explicit removal of HOI, HI, IONO<sub>2</sub>, and IxO<sub>y</sub> through scavenging or 20 heterogeneous recycling of HOI, IONO<sub>2</sub>, and INO<sub>2</sub> on aerosols, and then reference Saiz-Lopez et al., 2014. It should be made clear whether or not Saiz-Lopez did or did not omit iodine removal. I.e., “we didn’t do x, y and z (reference)” - is the reference an example where x, y and z were omitted, or not omitted?

Page 8 – section 2.6 and section 2.5 should be swapped (i.e., measurement methods before model description.)

Page 10, lines 1-4 – The suggestion that the observations from this work “compare well” with observations from Liu et al. (2013) needs to be backed up with something more quantitative. CHBr<sub>3</sub> seems to have a similar range, but the CH<sub>2</sub>Br<sub>2</sub> range from Liu et al. are about half the values from the current work. Can you be more specific about the region covered by Liu et al., i.e. where the observed maxima were located?

Page 11, line 11 – “... during a large part...”

Page 11, lines 18-21 – I have a bit of an issue with this interpretation. In Figure 4, we

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see that there were four subsurface measurements made between the surface and a depth of 25 m, and one single subsurface maxima is shown at a depth of about 20 m. First, it would be helpful to see the measurement uncertainties on this plot, as the data aren't super convincingly supportive of a maxima. Second, to suggest that there was "no subsurface maxima" in Figure 4(c) when only two measurements were made between the surface and the 25 m depth suggests that it is entirely possible that there is a subsurface maxima that just wasn't observed because no 20 m depth was measured. This needs to be included in the discussion.

Page 16, lines 18-20 – it would be nice to see a consideration of the daytime/nighttime differences in the correlations – if, as the authors are suggesting, there is atmospheric accumulation during the night, one might expect a better correlation during the night than during the day.

Page 17, line 29 – "... in the latter case."

Page 21, line 21 – are there really no units for salinity?

Page 29, line 2 – "note the colorbar in..."

Page 29, line 5 – I don't think "Global" is necessarily the right adjective of the observed radiation. Also, for this plot (Figure 3) and Figure 6, it would be better to change either the black or blue dots to a slightly different color, because they look very similar. Perhaps change the symbols, too, so that they're not all circles.

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