Dear Editor

Thank you for your comments to improve our manuscript. According to your suggestion, we've revised our manuscript. The changed parts in the manuscript are marked red. The following is a point-to-point response.

Best,
Yue on behalf of co-authors.

Comments to the author:
Dear authors,

Thank you for addressing the reviewer comments. I have one remaining issue I would like you to look at. In the revised manuscript you mention (line 569) that "... this would not really increase ". This sounds a little unscientific to me. Please give a value, so the magnitude of the effect is clear.

Andreas Engel

A: Thanks for pointing this out, indeed the sentence sounds a little unscientific. The flux in Ziska emission is calculated as $F = k_w \cdot \Delta c = k_w \cdot (c_w - \frac{c_{atm}}{H})$ (Eq. 3). As k_w is a function of wind speed and SST, the flux is determined by local meteorology and the air-sea concentration gradient ($c_w - \frac{c_{atm}}{H}$). For new flux calculations simultaneous measurements in water and air are required, which are currently not available. For our example if only the atmospheric $CHBr_3$ abundance c_{atm} increases, the corresponding flux will decrease. In particular, the $CHBr_3$ mixing ratio near Cape Grim used to calculate Ziska emissions is ~0.8 ppt, with a corresponding flux 109 pmol m^{-2} h^{-1}. If c_{atm} is increased to1.5 ppt, the corresponding flux will be reduced to a flux from the atmosphere into the ocean of -113 pmol $m^{-2}h^{-1}$. However, it is clear that in order to maintain 1.5 ppt atmospheric mixing ratio, high air-sea fluxes (driven by high oceanic concentrations) would be required. Given that we don't know the size of updated oceanic concentrations, we are not able to

provide a new air-sea flux value, but have instead added the following text to explain the situation: 'New $CHBr_3$ measurements in Cape Grim close to Triabunna show larger $CHBr_3$ mixing ratios (~1.5 ppt, Dunse et al., 2020) than the Ziska climatology (~0.8 ppt, Ziska et al., 2013). Similarly, the Ziska climatology is known to underestimate water concentrations of $CHBr_3$ in coastal regions with spare local measurements (Ziska et al., 2013; Maas et al., 2021). While the new atmospheric measurements suggest that a higher flux is required than currently included in the Ziska climatology, updated air-sea flux values can only be derived for simultaneous measurements in water and air, which are currently not available. It is important to note that such updated air-sea flux estimates would only impact the conclusions of our study if they would be much lower than the old estimates over large parts of the Australian coastline, a scenario which is highly unlikely.'