

Point-by-point responses to the referee's comments and all relevant changes made in the manuscript

Responses to the comments of Referee#2:

Comment 1: P5745 L14-15: Do the authors mean “a number of carbon and oxygen atoms in species”?

Reply 1: It means “the number of” carbon and oxygen atoms in species. To clarify this, the sentence has been rephrased as follows (P.2, L.13–17): “*Yatavelli et al. (2014) measured the phase partitioning of various organic acids in a pine forest using a micro-orifice volatilization impactor high-resolution time-of-flight chemical ionization mass spectrometer. They suggested that the number of carbon and oxygen atoms in species, together with the ambient temperature, control the volatility of organic acids.*”

Comment 2: P5746 2.1 Aerosol and gas sampling: Have the authors estimated an artifact formation from a double filter pack sampling system? The reason I ask this question is that I have a concern that particle-phase lactic acid and glycolic acid might evaporate off from the first filter during the sampling, and collected in the second KOH impregnated filter as gas-phase compounds, potentially underestimating the particle-phase organic acids (and vice-versa for the gas-phase). Do the authors have reasons not to use a denuder filter sampling system, which can minimize such an artifact, other than logistic difficulty? It would be helpful for readers to add a sentence or two about an artifact formation here.

Reply 2: We have not estimated artifact formation from a double filter pack sampling system. As the referee pointed out, it is possible that some particulate-phase organic acids could have evaporated off the first filter and become trapped in the second (KOH impregnated) filter during sampling. However, the ambient temperature during sampling was relatively low ($16.8\pm 4.3^{\circ}\text{C}$), which generally favors the phase partitioning of semi-volatile organic acids into the particulate phase, as discussed in Section 3.2. Therefore, we believe that any contribution of this possible artifact would have been small. Taking the comment into consideration, we have made an additional statement on this point (P.3, L.19–25): “*It is possible that some particulate-phase organic acids could have evaporated off the first filter and been trapped in the KOH impregnated filter during sampling. This would have led to underestimation of particulate-phase organic acids, and vice-versa for the gas phase. However, the ambient temperature during the sampling period was relatively low ($16.8\pm 4.3^{\circ}\text{C}$), which generally favors phase partitioning into particles, as will be discussed in Section 3.2. Therefore, any effect of this possible artifact is thought to have been small.*”

Comment 3: P5746 L10: Can the authors add a cruise and sampling point map?

Reply 3: Information on the cruise track and sampling locations is already available in our previous paper (Miyazaki et al., 2010a), which included a map showing average chlorophyll *a* distributions in surface waters of the North Pacific for the period of the ship campaign. It also discussed the experimental conditions encountered during the cruise, showing back trajectories along the cruise track. Instead of adding a map of the cruise observations, we have added the following sentence to the text (P.3, L.10–12): *“Information on the cruise track and back trajectories with average chlorophyll *a* distributions in surface seawater are given in Miyazaki et al. (2010a).”*

Comment 4: P5750 L14-20 (and elsewhere): ‘±’ should be replaced with ‘σ=’ or ‘SD=’ if these are average values and their standard deviations.

Reply 4: Because ‘±’ is typically used to represent an average value with a standard deviation, we decided not to replace it. Instead, we have defined the meaning of the symbol as “± SD” at the beginning of the paper (Abstract P.1, L.13).

Comment 5: P5752 L15: Have the authors detected carbohydrates in the samples? I imagine that these compounds can also be detected by the method the authors used. Can the authors comment on this in the revised manuscript?

Reply 5: The method described in this paper cannot detect carbohydrates (sugars). Some sugar compounds can be detected by filter extraction with dichloromethane/methanol followed by TMS derivatization using N,O-bis-(trimethylsilyl) trifluoroacetamide (BSTFA) and subsequent GC/MS analysis. Because that method digresses from the main topic of this paper, we have not added any comments on this in the revised manuscript.