

The revised manuscript “Boundary layer new particle formation over East Antarctic sea ice – possible Hg driven nucleation?” again presents a data set of limited gas and aerosol-phase measurements to support a hypothesis of mercury driven new particle formation. The data set was collected over a 32-day long field campaign and measured aerosol concentrations at 2 size thresholds and atmospheric gaseous composition data from a GC-ECD, MAXDOAS, and O3 analyzer. During the campaign, a single 4-hour long period of elevated solar radiation occurred approximately 2 hours before a new particle formation event. The revised manuscript has addressed my previous comments and remains well within the scope of Atmospheric Chemistry and Physics.

I again must bemoan the lack of any sort of aerosol chemical speciation as even something like offline filter analysis would make the authors’ case much stronger. I hope that in the future there will be an effort to include some sort of aerosol speciation.

In my previous comments, I stressed that the largest barrier to publication is convincingly ruling out all other possible nucleation sources. In terms of sulfur, the addition of table 2 and its associated discussion has made for a much stronger manuscript. I will not beleaguer the points about halogen chemistry. I realize there is a need for exploratory works.

However, I will ask one more question that has occurred to me on this second reading. Are the authors able to rule out the possibility that the air mass that was sampled on Oct. 18 did not pass over a penguin or seal colony (or possibly just an impromptu gathering of Antarctic megafauna)? Dall’Osto et al. (2012), cited in this manuscript, presents convincing evidence that nitrogenated compounds play a role in new particle formation and multiple papers (eg Legrand et al 1998, Schmale et al. 2013) have shown that amines can come from penguins. I do not believe that this point will break the manuscript but I do think that nitrogenated compounds deserve at least some mention and I am curious to hear the authors’ thoughts on the matter. Is it possible that a small inclusion of amines along with DMS could tip the box model closer to what was measured?