Atmospheric Chemistry and Physics Discussions

Atmos. Chem. Phys. Discuss., referee comment RC1
https://doi.org/10.5194/acp-2021-72-RC1, 2021

Comment on acp-2021-72

Anonymous Referee #1

Referee comment on "Measurement report: Indirect evidence for the controlling influence of acidity on the speciation of iodine in Atlantic aerosols" by Alex R. Baker and Chan Yodle, Atmos. Chem. Phys. Discuss., https://doi.org/10.5194/acp-2021-72-RC1, 2021

This paper presents an investigation of the speciation of water-soluble iodine in Atlantic aerosol collected during a cruise in Sept-Nov. 2011. The results and relative discussion is very interesting for a better understanding of formation and conversion of iodine species in aerosol. The paper was well presented and fit to the scope of the journal well, it is there recommended for publication after some revision.

- Only water-soluble iodine in aerosol was investigated in this work, not total iodine in the aerosol. This issue might need to be clarified in the title or abstract.
- It was well presented that marine emission is the dominant source of iodine in the atmosphere and the higher TSI Atlantic aerosol in the North Hemisphere was attributed to the higher MBL ozone concentrations in the North Hemisphere compared to the South Hemisphere. Meanwhile, the high iodate in the samples No. 15-19 was explained as the consequence of high concentrations of mineral dust originated from Sahara though uptaking HIO3 from air. So, where does the HIO3 in the air come from? How was marine emitted iodine converted to HIO3, even in acidic condition?
- One interesting point of this paper is to interpret the iodide and SOI as a result of iodate reduction in acidic condition, formation of HOI and reaction of HOI with organic substance. But, the main evidence (modeling) seems not strong enough to support this interpretation. Why iodide and SOI in the aerosol has to be produced through reduction of iodate, not directly formed during the release or formation of the aerosol? The reaction product of iodine with ozone can be reductive form of iodine (HI, I2), which can easily form SOI and iodide and associated to aerosol. Meanwhile, no strong (direct) evidence show the acidic condition in the fine particles. The different species of iodine in fine particles compared to coarse particle might be attributed to the different of source or formation pathway of iodine species, why was the direct sea-spray source of iodate in coarse particles excluded ?
- A much lower EF(TSI) in fine particles in AMT21 (648) compared to the previous cruises (1833-2402) was presented, a discussion on it is expected.
- The “Conclusion” section seems not a conclusion deduced from the discussion, but a further discussion/ perspectives. It might be better to change the title of this section or change the content of this section.