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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Speciation of ^{127}I and ^{129}I in atmospheric aerosols at Risø, Denmark: insight into sources of iodine isotopes and their species transformations" *by* L. Y. Zhang et al.

Anonymous Referee #2

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Review of the paper entitled: Speciation of 127I and 129I in atmospheric aerosols at Risø, Denmark: insight into sources of iodine isotopes and their species transformations By L. Y. Zhang, X. L. Hou, and S. Xu General comments: The paper presents interesting and detailed evaluation of the iodine isotopes (127I and 129I) species in atmospheric aerosols collected in Denmark. The separation techniques used and the data form innovative approach to the future research in iodine atmospheric variability and the effectiveness of using unique tracer technology. Sea spray aerosols are gaining large interest in the atmospheric science and being one of the commonly injected molecules in the atmosphere upon bio-productivity burst from the sea surface. These

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organic iodine molecules can be important components as cloud nucleation seeds. There is no doubt that the separation of iodine species, and in particular 129I species, in aerosols is still far from becoming a routine techniques and the leading role offered in this work will expand the scientific community understanding of the system atmospheric dynamics. One of the investigation unique challenges is the species representation of both aqueous-soluble and insoluble fractions. Furthermore, the investigation brought about the finding of relatively large difference between water soluble proportions of the iodine species from ocean-derived compared to land-derived aerosols. Also iodide was found as the dominant species of the water-soluble fraction. The iodine isotope species were used to elucidate the sources to the aerosols with respect to the marine or terrestrial environments.

Specific comments: 1. The investigation has utilized a sample collection procedure of aerosols that provide all sizes of aerosols (including dust). It is understandable that as the first study, the procedure was reasonable, but in future investigations it will be vital to have the dust and aerosols sizes separated to properly estimate resuspension and other material size effects. 2. It will be good to have a definition of atmospheric aerosols and dust in the beginning of the introduction in order to focus the reader on what is analyzed. 3. I agree with the authors that lack of international standards for the atmospheric aerosols when it comes to iodine makes the comparison rather floating, but this issue can be an excellent inter-laboratory exercise for the future. 4. Although not directly pertinent to subject of the investigation, it will have been interesting to obtain visual images (using SEM) of the aerosols particles to get some idea about size distribution and forms. 5. It is not clear what was the effect of temperature and wind speed on the iodine species distribution and may be this part needs further elaboration.

6. It was interesting that the authors used a correlation with 7Be isotope, but I am sure they know that these two isotopes have rather different atmospheric chemistry and physical behavior. The correlation between 127I and 7Be is rather interesting (although not many data points) and most likely point out iodide as possible adsorption

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site for 7Be. However, the authors did not mention the chemical procedure or the measurement technique used for 7Be. As with iodine, 7Be can also fractionate differently between water soluble and insoluble. A reference at the end of line 23 on page 25152 is needed. 7. The paper provides interesting information about iodine isotopes and species, and some improvement can be achieved through consideration of the comments.

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 25139, 2015.