

Interactive comment on “Isotopic composition of water-soluble nitrate in bulk atmospheric deposition at Dongsha Island: sources and implications of external N supply to the northern South China Sea” by J.-Y. T. Yang et al.

Anonymous Referee #3

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Review of “Isotopic composition of water-soluble nitrate in bulk atmospheric deposition at Dongsha Island: sources and implications of external N supply to the northern South China Sea” authored by J.-Y. T. Yang and others.

The authors present flux of atmospheric deposit of N species and ^{15}N and ^{18}O isotopic values of water soluble nitrate collected during 4 periods covering a year in an island in the northern part of the South China Sea. They attempt to trace the source of the N species using the dual isotope values and discuss potential implications of their findings.

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The presented data have scientific importance and will be useful to the scientific community if published. However there seems to be much room for improvement of the manuscript. The discussion appears to be excessive containing too much conjecture based not only on their solid data but also on various assumptions. I feel that reducing the discussion considerably focusing on the solid findings and their meaning will improve the manuscript considerably. Following are my suggestions.

- 1) it may be better to present the flux results for dry deposition and wet deposition separately. By combining them together, representativeness of the data is lost: the average flux cannot be used for either form of deposition. As the authors mentioned themselves, the data are CONTAMINATED by rainfall.
- 2) on measurement of $\delta^{18}\text{O}$ of nitrate (P9668, Line 20-), is there any isotopic fractionation involved for reduction of nitrate to N_2O ? How was this aspect examined? I may be mistaken, but if there is fractionation in the process from NO_3 to N_2O , then the data may be misleading completely. The authors need to clarify this in the method section or cite references if there are any.
- 3) P9670 Line 10: I wonder how the standard deviation (of positive values) can be as large as 80 when the average value is only 57? Please check the data in Table 1.
- 4) end member $\delta^{15}\text{N}$ value of coal on P9674 Line 12: how are these values obtained? From combustion of coal? If so, will these values be the same as $\delta^{15}\text{N}$ values of nitrate originated from coal burning? I wonder why the authors have not attempted to obtain $\delta^{15}\text{N}$ values of nitrate dry deposit from some of the cities in the mainland China to be used as an end member?
- 5) P9677: the authors had better stick to solid results only. They may focus on the influence of dry deposit of nitrate instead of introducing organic N while greatly increasing the uncertainty of their estimate.
- 6) P9678: most of the discussion in this page may be removed without hurting the main point.
- 7) P9679 and 9680: it seems that source-allocation for N_2 fixation and nitrate deposition etc. using $\delta^{15}\text{N}$ values has inherently too large an uncertainty to provide any meaningful information. The discussion in these two pages may be reduced considerably.