

Response to Anonymous Referee #2

General comments: This manuscript deals with the atmospheric deposition of nitrogen, particularly the organic fraction, from northwestern Pacific. The data provide new information in key regions where organic N has not previously been measured and help to better evaluate the role of organic N in the global biogeochemical cycle of atmospheric N. The authors acknowledge in their manuscript that "The results presented might be subject to large uncertainties, such as those associated with spatial variations of depositional fluxes across the EJS, the proportions of organic nitrogen in dry deposition, and the bioavailability of organic nitrogen in the atmosphere", however I believe that this study is a step forward to better understand the role of atmospheric organic N in marine environments. Here are some minor comments that may help the authors to improve their manuscript.

=> We would like to thank Anonymous Referee #2 for the careful review and constructive comments.

Specific comments:

Page 5, line 12: Please indicate the number of samples.

=> The number of samples has been added in the revised version of manuscript.

Page 7, line 4: I wonder how the author estimate the detection limit of DON, since there is no analytical method to measure it directly. Please comment.

=> While in most previous publications detection limit (DL) of DON was not given, Zhang et al. (2001) and Walker et al. (2012) estimated this value using the DLs for each nitrogen species, following the error propagation of standard deviation. In the same manner, using the DLs of NO_3^- , NH_4^+ , and TDN (calculated as three times the standard deviation of blanks), we estimated the DL of DON by treating DLs as standard deviations. The DL value for TDN involving in this estimation was $1.1 \mu\text{mol L}^{-1}$, which is in line with the typical value for a Shimadzu TOC/TN analyzer using high-temperature catalytic oxidation method (Badr et al., 2003). The value of 2.5 for TDN in the manuscript was calculated using the blanks obtained during another period when the instrument was less stable. We have clarified the confusions and corrected the mistake in the revised manuscript.

Page 7, line 5: Please refer what kind of analytes you certified by using the reference materials.

=> This information has been added in the revised version.

Page 9: The discussion in section 3.1.2 is based on the classification of air mass origin. I suggest to change the title as follows: Potential source regions based on air mass origin.

=> The title for this section has been changed as suggested.

Page 12, line 1 -11: Maybe it is worth to comment the correlation founded between DON and NH₄⁺.

=> In this study, based on the knowledge of major factors controlling the variations of chemical compositions of our samples (obtained using principal factor analysis), we speculate that DON mainly originated from agricultural activities by using the exclusive method as well as other evidences found in literatures. The correlation between DON and NH₄⁺ was less significant ($R^2 = 0.39$). In addition to the source distribution, the interrelationships among chemical species in wet deposition are also influenced by other factors, such as chemical and physical reactions involving these species (e.g., neutralization of NH₄⁺ by acidic anions). Therefore, we did not use correlation analysis for source identification of DON in this work.

Page 37, Fig.4: It would be better, if in this figure you included also the number of samples corresponded to each air mass sector.

=> The number of samples corresponding to each air mass sector has been included in this figure as suggested.

Technical corrections:

Page 11, line 17:.... indicates *that* crustal contribution....

=> It has been modified as suggested.

Page 35, Table 4: Please replace "pus" with "plus"

=> It has been revised.

References

Badr, E.-S.A., Achterberg, E.P., Tappin, A.D., Hill, S.J., Braungardt, C.B. (2003) Determination of dissolved organic nitrogen in natural waters using high temperature catalytic oxidation. *Trends in Analytical Chemistry* **22**, 819–827.

Walker, J.T., Dombek, T.L., Green, L.A., Gartman, N., Lehmann, C.M.B. (2012) Stability of organic nitrogen in NADP wet deposition samples. *Atmospheric Environment* **60**, 573–582.

Zhang Q. and Anastasio C. (2001) Chemistry of fog waters in California's Central Valley – Part 3: concentrations and speciation of organic and inorganic nitrogen. *Atmospheric Environment* **35**, 5629–5643.