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Interactive comment on "Seasonal shifts in the contributions of the Changjiang River and the Kuroshio Current to nitrate dynamics at the continental shelf of the northern East China Sea based on a nitrate dual isotopic composition approach" *by* Y. Umezawa et al.

Anonymous Referee #1

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General comments: In this manuscript, Umezawa et al. investigated the dual isotopes of nitrate and chemical characteristics of water column in the northern ECS to clarify nitrate sources and explore its dynamics during summer and winter. Their findings indicate that different sources of new nitrate in winter and summer and the authors suggested that the distribution of nitrate isotopes were controlled by nitrate assimilation with some bias in a few sites very likely due to nitrification and/or N input from atmosphere, especially in summer. The paper is well written and the data presented

in the paper are comprehensive. Also, its contribution fits within the scope of Biogeosciences.

Specific comments: 1) In d15N-d18O plots (Fig. 4 and 5), most data seem to deviate from the line of $\Delta\delta$18O/$\Delta\delta$15N = 1:1, suggesting that other processes (e.g. N2 fixation, N deposition) control the isotopic composition of nitrate in the surface and subsurface layers. However, the authors put emphases on estimating N isotope fractionation during assimilation using d15N-ln[NO3] diagram and they suggest that only a few data out of the fractionation lines were probably attributed to other processes. Explain this inconsistency. 2) Authors have missed the very recent publication (Chen et al., 2013, Acta Oceanol. Sin., 32: 11-17) which deals with similar topic in nearby region. Please ascertain what additional insights and findings been brought to the body of literatures for the ECS. 3) A recent study (Zhang et al., 2011, GBC, 25, GB3020) showed much higher N deposition in winter than that in summer. So, why the signal is not significant in winter? 4) Page 10150, Line 11-12: add the detection limit and standard deviations of [NO3] and [NO2] measurements. 5) Page 10151, Line 1-3: what are the d15N and d18O values of the laboratory working standard? Since many of d15N values of samples largely deviate from the N isotopic values of international isotope standards, could you evaluate the offset of calibration? 6) Page 10160, Line 3-9: I cannot understand that the constant characteristics of water column from the bottom to middle layer at some sites could imply minor effect of sedimentary denitrification (SD) in this region. Actually, SD has little isotope fractionation on d15N and d18O in nitrate thus SD is not detectable by using isotopes unless there is a release of pore water containing mid-way SD. 7) Page 10161, Line 1-10: I note that d15N of nitrate in surface and subsurface at some sites (e.g. D11, D13, C1) in July 2011 followed different fractionation lines. Could the authors give some interpretations for this phenomenon? 8) Page 10161, Line 11-15: "In July 2009, when. . ." This sentence is so ambiguity and difficult to understand, please rewrite it. 9) Page 10162, Line 8-10: the authors mentioned Changjiang River plume goes northeasterly in the open ocean, which is basically towards the sampling locations. Moreover, based on T-S diagram the Changjiang freshwater had an appar-

ent influence on the nearshore sites with lower salinity. I wonder why the river-derived nitrate was impossible to supply continuously to “CDW”.

Page 10153, Line 6-7: the range of 1-3 in winter?

Page 10157, Line 24-29: add the unit (‰ of 15ε

Page 10162, Line 27: change “will” to “may”. If the isotopic fractionation of NH4+ assimilation is high and/or the d18O of nitrate and nitrite produced by nitrification is low (e.g. Buchwald et al., 2012 L&O), $18\varepsilon/15\varepsilon$ may shift to below 1:1.

Fig. 4 and 5: I suggest changing “$18\varepsilon/15\varepsilon$” to “$\Delta\delta$18O/$\Delta\delta$15N” in the figures, same as that in figure captions.

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