Overall comment:

This is the revised version of the manuscript by Nakagawa et al. entitled "Export flux of unprocessed atmospheric nitrate from temperate forested catchments: a possible new index for nitrogen saturation". I would like to acknowledge the considerable effort undertaken by the authors to address the various issues I had raised in my previous evaluation. I feel that the revised manuscript is much stronger, more well written, and above all clearer than the first version. The authors did respond to my questions in a way that satisfied me, and I now understand what they were trying to do in this work. Here, they use the Matm/Datm ratio as an independent way to assess the nitrogen saturation status of forested catchments in Japan. They applied this method on three catchments that have been heavily monitored in the past, and for which they had already a fair knowledge of the nitrogen saturation status. They find that the use of the Matm/Datm ratio provides a good indication of the <u>relative saturation level</u> between forested catchments. While I still have a few comments, I don't see why this manuscript shouldn't be published in Biogeosciences.

Main comment:

My main interrogation now is regarding your explanation of the difference in the Matm/Datm ratios between the studied catchments: you say that the difference is due to different biological assimilation rates, caused by different nitrogen saturation status. But couldn't the different biological assimilation rate be caused only by the difference in the vegetation in the forest for each catchment? The tree species abundances are different in KJ, IJ1 and IJ2 forests: could that cause the difference in the Matm/Datm ratios because the trees would have different metabolic rates? And in that case, the Matm/Datm ratio would not be an indicator of N saturation, but just of the retention capacity of a catchment? I think this needs to be at least discussed in your last section.

Specific comments

Section 2.3: Please expand a bit on your methods here. Explain for instance the conditioning of the samples (fridge, freezer, filtration) and if you use acid solution to stop any biological activity, etc.

P.7 line 10 and P.8 line 11: Please refer to Aber et al. (1989) when mentioning N saturation.

Aber, J. D., Nadelhoffer, K. J., Steudler, P. and Melillo, J. M.: Nitrogen saturation in northern forest ecosystems, BioScience, 39(6), 378–386, doi:10.2307/1311067, 1989.

P.15 l.3: Please refer to Bourgeois et al. (2018) when mentioning NO3-atm export from the snowpack to the river.

Bourgeois, I., Savarino, J., Caillon, N., Angot, H., Barbero, A., Delbart, F., Voisin, D. and Clément, J.-C.: Tracing the fate of atmospheric nitrate in a subalpine watershed using $\Delta^{17}O$, Environ. Sci. Technol., 52(10), 5561–5570, doi:10.1021/acs.est.7b02395, 2018.

P.19 l.11: Please remove "huge", or give an idea of the reservoir of nitrate it represents if you know it. No need to emphasize on the size, we understand the idea of dilution here.

P.21 l.4: Please replace "fractionation" with "enrichment"

Table 1: Maybe add a row with Matm/Datm ratio for each catchment