There are a few outstanding points that were not sufficiently addressed.

1. Reviewer #1 raises a significant point about the fact that high atmospheric N leaching rates can also be caused by hydrology (fast leaching rates) rather than biology (slow production rates). These two scenarios can be thought of as ‘kinetic limitation’ (not enough time for atmospheric N processing) v ‘capacity limitation’ (not enough biology to process all received atmospheric N), *sensu* (Lovett and Goodale, 2011). These two competing explanations could not be distinguished based solely on correlations with rainfall amounts. This is because transit time of NO3- through the canopy, soils, and vadose zone will depend on multiple factors, which include rainfall amount as well as soil types, vegetation root structures, and antecedent moisture conditions. The site descriptions, data analysis, and discussion need to be expanded to adequately address the kinetic limitation hypothesis for Matm/Datm dynamics.
2. Based on Fig. 1 supplied in the response to reviewer comments there is a strong inverse relationship between gross nitrification rate and Matm/Datm (i.e., more nitrification means lower export of atmospheric N). It is only the inclusion of literature values that breaks down the relationship. So why is this? A robust discussion that addresses how (or how not) the high gross nitrification rates fit, or don’t, the interpretation that Matm/Datm represents differences in catchment N saturation status.
3. More details are needed in the methods section about how uncertainties were incorporated into the findings. The Matm/Datm calculations rely on several assumptions that needed to be made in order to account of lack of data (streamflow) or overlapping measurement periods (atmospheric sampling did not occur on the same years as stream water sampling). There are accordingly a number of significant sources of uncertainty incorporated into the Matm/Datm calculations: the relationship between precip amount and streamflow (which itself incorporates a number of uncertainties: the relationship between temperature and evapotranspiration, potential rate of loss to groundwater), the interannual consistency of 17O of atmospheric nitrate, and the spatial consistency in the amount of rainfall and the 17O of atmospheric nitrate. It is therefore essential to critically evaluate the potential magnitude of impact these assumptions have on the resultant Matm/Datm values. A sensitivity analysis needs to be performed for each parameter, and these ranges need to be clearly represented in the figures, tables, and text.
4. I am still worried about the reliance on, essentially, rainfall and average annual catchment temperature to calculate downstream NO3- discharge. The relationship between rainfall amounts and stream discharge is generally highly complex, and affected by a number of factors such as catchment slope, soils, vegetation, and groundwater connectivity. These factors need to be robustly and quantitatively addressed (i.e., a hydrodynamic model is needed) given how important Fstream is to Matm, and thus the interpretation of systems as N saturated.
5. As a consequence of the above (big) assumption that Fstream = precipitation – evapotransiration, the Matm/Datm ratio is essentially: $\frac{[NO3]stream*(P-E)}{[NO3]bulk*P}$ (ignoring for a moment the calculations around dry and gaseous deposition). This really is then a almost directly a comparison of the concentration of 17O-NO3- measured in stream water over a few years relative to the concentrations of 17O-NO3- measured in the rain over the previous decade, with correction factor for the average annual temperature of the catchment (used to calculate E). Without a more robust approach to uncertainty and stream flow, and a more nuanced discussion of these uncertainties, it is hard to draw any conclusions about ecosystem N saturation from these values. It is also difficult to justify statistical analyses comparing temperature, precipitation, and discharge to Matm/Datm, given that all three parameters are directly used to calculate the ratio (and indeed that temperature and precipitation are themselves used to calculate discharge).

6. I am still very confused about the relationship between FK1 and FK2. Are these in the same catchment or different catchments? Does one flow into the other (referred to as upstream v downstream sites at some points), or do they flow off different sides of a ridge? If the latter, does this affect the amount of precipitation received at both sites? If the former, should these really be considered as independent sites? It also seems the reliance on rain and temperature to determine flow would have a big impact here. Are the streams actually the same size, as would presumably be determined by these calculations?

Lovett, G.M. and Goodale, C.L. (2011) A new conceptual model of nitrogen saturation based on experimental nitrogen addition to an oak forest. Ecosystems 14, 615-631.