

Interactive comment on “Deposition of nitrogen and phosphorus on the Baltic Sea: seasonal patterns and nitrogen isotope composition” by C. Rolff et al.

Anonymous Referee #2

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General

This paper presents some nice and original results on the isotopic composition of nitrogen in rainwater of the Baltic Sea area. The paper is, in general, well structured (see some minor remarks) and clearly written. Data acquisition and treatment are, in general (see some minor remarks), of high scientific quality, literature review is complete and up-to-date and conclusions clearly announced and supported by observations. I recommend this paper for publication in Biogeosciences with minor modifications.

Minor remarks

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Interactive Discussion

Discussion Paper



In **INTRODUCTION**: The introduction consist of 3 distinct parts with the aim of the study spread over the second and 3d part. The 3 parts are each very clear and well written, but parts 2 and 3 could be better integrated too each other in order to better link the 2 main objectives (isotopes of N deposition and N₂ fixation control by P deposition). Merging parts 2 and 3 with in final a clear phrase exposing the aim of the paper would contribute to better linking the 2 subjects considered in the paper.

In **SAMPLING**: The water in the collectors is replaced once a month. This probably does not affect the total N content (neither its isotopic signature) in the sample but may change the N speciation, especially during warmer periods. It would be good to mention this. The authors mention an eventual underestimation of the organic N content later in the discussion but do not comment on the eventual effects on NH₄/NO₃ ratio. A second and more technical remark also concerns the functioning of the collector in winter when precipitation comes as snow.

In **RESULTS**: In Table1- there is an error in the AVERAGE line of the table: the values for the NO₃, organic N and total N loads are shifted 1 cell right.

In **DISCUSSION** part 4.2 **NUTRIENT LOADS**: As the authors analyze collected rainwater and calculate deposition rates by multiplying concentrations with precipitation data, their results and conclusion should normally only concern wet deposition of N and P. However, their deposition rate estimates for N do quite agree with total deposition rates (including dry deposition) in the Baltic from literature. This seems quite surprising to me but is not discussed by the authors, and needs some clarification. Does this mean that dry deposition is not (or less) important in this region?

In **CONCLUSION**: Again as for the introduction, the P story is not integrated to the N story. For this reason, the P story seems not to belong to the general outline of the paper.

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