

Interactive comment on “Nutrient dynamics along a precipitation gradient in European beech forests” by I. C. Meier and C. Leuschner

Anonymous Referee #1

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This paper aims to investigate soil and plant nutrient status of beech forests along the precipitation gradient. The experimental design and data presented in this manuscript are very interesting and worth for reporting. Authors were successful to show clear patterns and reasonable discussion as a whole. However the data are not entirely satisfactory to be evidence for possible mechanisms. Some data shown in this study are already published in previous papers by authors and original data of this study seems too narrow. Furthermore the manuscript includes many problems and need considerable revisions as follows. The manuscript needs considerable revision before publishing.

Major points:

1. N deposition of study sites Differences in precipitation may affect N deposition among
C4576

sites. Furthermore location of sites may also affect N deposition (i.e. distance from industrial area etc.). However the manuscript did not show N deposition data and detail location of each site. Authors should show deposition data or reasonable references and state explanation how deposition affects the results of this study.

2. Plant sampling Leaf N and P concentration may vary among years. However authors calculated resorption efficiency using different year's data. Authors should state reasonable explanation about this.

3. N and P availability This study hypothesized that precipitation mediated soil acidity gradient affect soil and plant nutrient status. However N mineralization rate and resin P which are index of N/P availability did not show clear trend along the precipitation gradient in spite plant leaves show trends. I suppose method for assessment of N and P availability of this study was not satisfied ones. Authors did only twice in situ incubation for N and one time for resin P for upper mineral soils. As authors mentioned in the manuscript, plant can use N and P in organic layers. For organic layers, authors showed total content of N and P in organic layer which was not suitable for N and P availability assessment. Authors should do more detailed discussion for relationship between soil (include organic layer) N and P availability and plant nutrient status, and possible mechanisms about the results. Furthermore increasing root biomass also can affect plant nutrient status even when soil nutrient availability decreased. In this study, fine root biomass was higher in low availability sites. This may mitigate nutrient limitation in low availability sites. Authors should do more detailed discussion in this context.

4. N and P limitation According to the results of leaf N/P ratio, I suppose studied forests are under “relative” P limitation in the sense of NP ratio studies such as Koerselman and Meuleman 1996 J.appl. Ecol33:1441-1450 and Güsewell 2004 New Phytol. 164:243-266. Please discuss the results of this study in the context of N and P limitation.

Minor points:

P11903L13: Please show location of each sites.

P11903L17-20: Please show stand structure of each sites.

P11905: Soils samples sieved or nor?

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C4578