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Biogeosciences Discussions

Interactive comment on "The strength of the biotic compartment to retain nitrogen additions prevents nitrogen losses from a Mediterranean maquis" *by* T. Dias et al.

Anonymous Referee #2

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Dias review General Comments This paper addresses the consequences of N additions in a sensitive, but understudied ecosystem type in Europe. Because of the exposure of the Mediterranean ecosystem to increasing N deposition, it is important to quantify the types and magnitude of change that N additions will cause. This information can be used to assess the risk of the ecosystem to change and in setting deposition thresholds (critical loads). The study design allowed some assessment of the combined and individual effects of nitrate and ammonium (NH4NO3 addition and NH4 only additions). It would be helpful if the authors explored the differential response to ammonium and nitrate a bit further as this is an important topic in the literature currently. For example, can they extend their evaluation of the responsiveness

to ecosystem to nitrate compared to ammonium beyond soil N availability to include plant response (and overall ecosystem response). The authors discuss these topics, but they could be presented a bit more prominently. Additional related questions could be addressed. Does the higher N retention in the nitrate additions indicate a bigger or smaller ecosystem response (presumably the N ended up in the plants in the NH4 treatment altering the plants more and the soil less). Also, it is interesting to note that this seems to represent a different pattern from temperate forests with even deposition across the year where nitrate is the more mobile ion and is less likely to accumulate in soil.

The major problem that I had in reading this paper is that the authors keep asserting that the soil N availability in the autumn reflects the total N added up to that point. They point to table as evidence of this. In the three treatments, they report that they added 20 and measured 11, added 20 and measured 22, added 40 and measured 32 (ugN g-1). First of all, these values do not seem to "reflect the total N added" in any quantitative sort of way. Furthermore, the additions are described as 40 and 80 kg N ha-1 yr-1, so it is unclear why, after a full year of treatments, only 20 and 40 kg of N would have been added. This makes parts of the discussion unconvincing.

Parts of the discussion are a bit speculative, but this speculation is fairly clearly identified. Overall, this paper will make a significant contribution to the literature on this ecosystem once the above issues are addressed.

Specific comments 8042 8 unclear what is meant by "they reflected N additions in autumn matching the total N added". See above.

25 It is more correct to say that demand has become uncoupled from N availability, not visa versa

8043 4 It may be an oversimplification to suggest that N availability is synchronous with plant growth in temperate forest ecosystemsâĂŤcounter examples include snowmelt N leaching prior to budbreak and post-leaf drop nitrate losses in the fall.

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11 Would any Fenn studies be relevant to cite here?

14 “nonlimiting water availabilities” is awkward

8045 2 Doublecheck the 145 kg N/ha/yr value (Fenn). This sounds too high to be deposition aloneâĂŤwas there an N addition as well? 7 why list both agricultural and predominately agricultural? It seems redundant.

8047 10 shouldn’t change over time be ((P2-P1)/P1) x 100?

8048 6 what is the basis for this assumption about annual litter production?

8049 7 did N:P also increase? 9 Use caution in reporting non-significant changes 14-17 this text is not necessary since the treatment application was already described on p. 8045 19 “several occasions” This is unclear, weren’t they only measured twice (summer and fall 2007)? It would be better just to give the seasons measured. 20 what is meant by “reflected the N added”. I assumed that means N current =Ninitial + Nadded, but this does not seem to be the case.

8050 9 Was the apparent increase in % cover between 2007 and 2008 significant for the control and 40 trts? Why did it increase (including in the control)?

8050 lack of litter response: any reasons to think that this might be altered with a longer period of fertilizer application?

8051 It was be helpful for the reader to have some ranges for the comparisons in this paragraph (i.e. values reported in the literature)

22 This text beginning here is a little bit difficult to followâĂŤit could be sharpened a bit. It does not seem incorrect to measure N availability in the spring per se. It sounds like that would give a sort of baseline of N availability for the ecosystem, while the autumn value (as the authors assert) is most significant for evaluating plant response and, thus, the overall impact of added N.

Table 1 what does “*” signify? Figure 1 I found the size of this figure to make it illegible

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in the printed version. Figure 2 the large axis scale for C:N makes it difficult to see changes. Maybe an axis break would be useful. Technical Corrections Also, please see attached comments on manuscript. I underlined awkward phrases with a wavy line. 8043 22 If “over time” refers to all the measurements listed (community composition and plant and litter N pools), it needs to go at the end of the sentence.

Section 2 heading, should this be Materials and Methods?

8044 19 awkward: “whose”

8046 15 what does fwt? In general, for an international audience, it is better to either spell out the abbreviation or define it at first use. (dwt, etc.)

8053 4 correct to “respective

8057 2 should be P. Neitlich, not O. Neitlich

Please also note the supplement to this comment:
http://www.biogeosciences-discuss.net/8/C3519/2011/bgd-8-C3519-2011-supplement.pdf

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Interactive comment on Biogeosciences Discuss., 8, 8041, 2011.