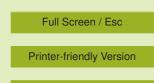**Biogeosciences
Discussions**

Interactive
Comment

Interactive comment on "Three years of increased soil temperature and atmospheric N deposition have no effect on the N status and growth of a mature balsam fir forest" *by* L. D'Orangeville et al.

Anonymous Referee #3

Received and published: 15 April 2013

General comments:

This study examined the impact of soil heating and increased inorganic N deposition and earlier snowmelt on soil N availability, needle N concentration and radial tree growth. The main conclusion of the study is that after three growing seasons of treatments (April to October), no significant differences were observed, except for an increase in NH4 in the organic layer and an earlier peak in diameter growth in heated plots in 2010. The authors attributed this lack of effect to intense competition for N in those N-poor forests.

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

I believe that this study would make an interesting addition to the literature on the topic after considering the following comments. I'm not entirely convinced that the lack of effect is explained by what the authors refer (soil competition). The authors will have to persuade the readers that their experimental design and methods used are not responsible for these results. I believe the authors should discuss more about the implications of 1) using heating cables vs. infrared warming, 2) heating only during the growing season (i.e. Apr to Oct) vs. year-round, 3) having two years of temperature/precipitation anomalies in their data set (2010-2011), 4) the heating system malfunction in August 2009, 5) not having sampled the mineral soil by soil horizons (the authors sampled the first 30cm of the mineral soil, not taking into account the variable depth of the Ae and B-hor, that could have bias their results). I would also like to see a graph of the evolution of soil temperature for the control, fertilized, heated and fertilized+heated plots during the monitoring period.

Specific comments:

I find the title misleading. It seems like the treatments were applied year-round. Please consider revising.

Page 1314, line 7: I would add "during three consecutive growing seasons" at the end of the sentence.

Page 1317, lines 5-17: I would add the average thickness of the forest floor layer. Lines 18-22: Can these anomalies explain these non-significant results?

Pages 1317-1318, section 2.2: It is not clear to me how many replicates you have. Please indicate more clearly or perhaps add a figure showing the experimental design.

Page 1318, section 2.3: The cables were buried at the organic-mineral interface: What was the forest floor thickness variability across plots? To what depth the heating capacity of cables is lost, i.e. is the 4C warming lost at 5, 10 or 15 cm depth in the mineral soil?

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

Page 1319, line 7: How long the system was interrupted?

Page 1319, section 2.4: The N treatment corresponds to three times the concentrations of precipitation at these sites. I would like to see the value in kg ha-1 y-r. Page 1320, line 22: Why not sampling per soil horizons? The authors sampled by fixed depth. This way, the soil samples contained variable amounts of Ae (eluvial horizon) vs. B-hor (enriched horizon), which may have diluted a treatment effect.

Table 2: Please define BAI in the title.

Figures 3 and 4: Please indicate significant differences with different lowercase letters. Please indicate the number of replicates (n=?).

—

I hope that the above comments will be useful to the authors.

Interactive comment on Biogeosciences Discuss., 10, 1313, 2013.