

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 #4

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The research concerns a study on the effect of soil warming combined with realistic increased N deposition effects on the N status and growth of a fir forest. The study is well designed including replicates and controls. One interesting point is that the N addition was carried out on top of the canopies to mimic deposition effects, using a system of pumps and reservoirs. Surprisingly, little effect of warming and additional N depositions was observed on N availability and plant growth, questioning some of the conclusions from previous studies. I suggest acceptance of the paper, even if the air drying of the samples before extraction may have really affected the quality of the

C1047

results obtained. I think that this methodological approach has to be clearly justified in the materials and methods section, adding the proper references.

Some technical remarks:

1314, Line 6: Change 40C into 4°C 1317, Lines 9-11: Please add the depth of the different soil horizons. Is there a great variability of soil horizons depth between the different plots? 1320, Line 22: Change “in the organic and mineral soil” into “in the organic and mineral horizons” 132, Line 23: I think this could be a critical point because I think it’s better to extract fresh soils, without drying it for such a long time. Is there a reference that can justify air-drying before extractions for the determination of soil inorganic N? 1322, Line 1: FH referred to what soil organic horizon classification? Is the Canadian system of soil classification? Since it is a podzol, in the first 20 cm you didn’t find an A or E horizon? 1325, Line 16: Why the heating process increase the volumetric soil water content? I expected an opposite behaviour due to the increase of the evaporation processes. 1326, Line 5: Change 14.6 $\mu\text{g } 10 \text{ cm}^{-2}$ into 14.6 $\mu\text{g cm}^{-2}$ 1328, Line 6: What do you mean by prevailing climatic conditions of 2010? Do you refer to the climatic conditions during the growing season? What about the winter conditions? Did the depth of the snow cover differ between the 2 years? And consequently did the soil temperature results comparable during the winter seasons in both years? I think that also changes in winter conditions could affect the N cycling during the subsequent growing season. 1329, Line 19: What do you mean by strong N sinks? Do you mean soil microbial N immobilization? Do you have data about the microbial N?

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C1048