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Biogeosciences Discussions

Interactive comment on "Effects of thinning and fertilization on soil respiration in a cottonwood plantation in Iceland" *by* J. Á. Jónsson and B. D. Sigurdsson

Anonymous Referee #3

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General comments:

Jonsson and Sigurdsson present the results of a thinning and fertilization experiment within a young plantation. They present changes in the soil carbon efflux in the first growing season after treatment as differences with untreated control plots. The paper presents the observations and a discussion of the results and possible reasons for the found differences in the soil CO2 efflux between the treatments. It is relatively concise and to the point written, although at several points the reader is given results without showing the data and might be clarified by an extra table or figure.

The setup and idea of the experiment is clearly presented. However, reading the ar-

ticle I am left with the feeling that the measurements performed and presented in the article were not sufficient to convince. The conclusion that thinning leads to a lower autotrophic respiration is supported by the results and is probably the most plausible explanation, but a number of open questions is left.

Although the paper is not strong I consider the results of this paper sufficient for publication. This type of measurements is absolutely needed for supporting the development of soil respiration models. I consider the scientific significance fair to good.

Specific comments:

Climate and soil temperature measurements It is unclear how many sensors were actually placed out in the field from the material and methods (page 9263- paragraph 2.7). In figure 4 it is presented that only two sensors were places in each treatment. This is a rather low number and not easy to use for analyzing temperature differences. Although the results show a temperature difference as expected between the thinning treatments it is not possible to analyze possible effects of the thinning residues left in the forest, which can actually act as isolation cover. Please add to the discussion a note on why the temperature difference between the treatments already starts during winter from December. Was there a snow cover during winter or not that it gives different soil temperatures.

Soil respiration measurements The number of measurements of the soil CO2 efflux was 192 with 8 measurements in each treatment-plot. The number of repetitions in the season was only 4, which makes it a rather short period of time for the experiment. It is not clear from the paper when the measurements were made exactly during the day and or the order of measurements was different. The efflux of CO2 can change during the day and thus it can be important to spread the readings at the different treatments over the day. It is mentioned that the measurements were corrected for temperature differences, but it is unclear how exactly the correction was performed.

Differences in soil water content I would like to see a short note in the discussion on

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the possible effect of soil water content. It is mentioned that soil water content is at field capacity and that it is not expected to have affect on the tree growth and ecosystem processes. Thinning lowers the interception and the soil water content of the topsoil. How much is actually reaching the soil can be discussed as it depends on the forest floor vegetation and the thinning residuals left in the forest. Higher soil water content can also be a cause to a lower soil respiration

Page 9260 Site description: Please describe the forest floor. What was the type of vegetation? Were those included in the collars and chamber? Page 9262 Paragraph 2.6. Describe more about the collars and instrument. What was the size of the collars and the chamber? Assuming that the collars were placed after the thinning, were the collars randomly placed also under the thinned trees or between the thinned trees on the forest floor? Page 9267 line 4: Measurements of soil respiration took place during the months directly after the thinning. How much litter was actually added to the soil and within the collars at that time from the thinned trees? I can assume that the leaves were still on the thinned trees. Page 9268 Conclusions: Note that the results presented are from the very first months after thinning.

Technical comments: Page 9258: be consequent in use of abbreviations: line 19 and 20 y-1 while eg on page 9267 year-1 is used. Page 9260 line 1: change 'carbon efflux' to 'carbon dioxide efflux' Page 9260 line 19 Change 'were monitored' to 'was monitored' Figure 5: add point in '(22 June to 22 September). Each bar'

Interactive comment on Biogeosciences Discuss., 6, 9257, 2009.