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Interactive comment on “Seasonal and annual variation of carbon fluxes in a young Siberian larch (*Larix sibirica*) plantation in Iceland” by B. Bjarnadottir et al.

Anonymous Referee #1

Received and published: 3 September 2009

General remarks:

This study describes the seasonal and annual variation of carbon fluxes in a young Siberian larch plantation in Iceland. The topic of this paper is within the scope of Biogeosciences. Furthermore, this study is well designed and the manuscript is well organised and clearly written. The authors clearly indicate the importance of this study and value of the results. In this paper, the authors try to relate interannual variability of the NEE component fluxes (GPP and Re) to environmental and biological drivers.

My main concern is that discussion of interannual variability overstretches the information contained in the data. Given the nature of such analysis, the time series is reduced

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to 3 data points, one for each year (figures 5 and 7). These points form the basis of subsequent statistical analysis. In my opinion the relevance of a regression based on three points is very limited especially in the absence of theoretical target values.

If possible, the authors could add more years to the analysis. Although this would improve the credibility of the statistics to some extent, it would not overcome my concern unless 10 or more years of data are available. Therefore, I would like to encourage the authors to explore the intra-annual variability and then try to relate the latter with the interannual variability. In my opinion, the three presented years are suitable for detailed analysis. Climatic similarities between the first and the last year allow to determine the magnitude of the effect on NEE due to ageing of the stand. The second year, with an anomalous spring could inform us about the effects of spring frost on GPP, Re and NEE. A possible question to address is: what happens to the photosynthetic and respiration parameters after a frost event (see for example Richardson et al. 2007 in *Global Change Biology*)? By using a simple photosynthetic and respiration model and fitting this model to different subsets of the data, one could quantify the effects of the frost event.

If the focus is shifted towards the effects of the spring events rather than settling on a hasty conclusion concerning inter annual variability, I'll be happy to recommend publication.

Specific remarks:

Page 6607, line 16: concerning the energy balance closure. This could be improved if you would add an energy storage term. An example how to calculate this storage term can be found in:

Lamaud, E., Ogée, J., Brunet, Y., Berbigier, P., 2001. Validation of eddy flux measurements above the understorey of a pine forest. *Agricultural and Forest Meteorology* 106, 187–203.

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Page 6612, line 27: maybe it is better to note NEE values as negative when you are talking about uptake.

Page 6612, line 14-18: this belongs to discussion and not to results.

Page 6617, line 7: "...it was noteworthy that annual NEE was lowest..." Should be: uptake was lowest.

Table 2: it is not necessary to give so many decimals for the estimated parameters

Figure 2: Units of ordinate are not correct.

Figure 3: in the caption, CO² should be CO₂

Figure 4: why are there no statistics of these regressions?

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