**Biogeosciences
Discussions**

Interactive comment on "Carbon allocation to biomass production of leaves, fruits and woody organs at seasonal and annual scale in a deciduous- and evergreen temperate forest" *by* M. Campioli et al.

Anonymous Referee #2

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General comments:

This study describes the carbon allocation between tree organs for two contrasting (deciduous vs coniferous) temperate forests, with a special focus on its seasonal evolution. The paper is well structured, results are presented in a compact way and the writing style is adequate. The main part of my expertise being on micrometeorology and flux tower measurements rather than on ecophysiology, I will react mainly on GPP estimations.

All the study relies on the reliability of GPP and NPP estimates. The lack of an uncertainty analysis for NPP estimates has already been pointed out by the referee n°1. The same remark is applicable to GPP. All GPP computation information are given in three lines on page 7581. To my opinion, these information fall too short for the following reasons:

1) you need to discuss to which extent the choice of a specific flux-partitioning method may impact the obtained GPP. Specifically how it could impact the seasonal evolution of the obtained GPP and thus of the ratio NPP/GPP, which is a major focus of your paper. You can rely for example on Desai et al. (2008), AFM for this discussion.

2) You need to prove the robustness of your GPP estimations by performing an uncertainty analysis in your flux partitioning method. This is especially true for the site of Brasschaat because this site presents limitations in terms of the representativeness of the target ecosystem in the eddy flux measurements. Looking at Nagy et al. (2006), it's obvious that a very huge amount of eddy flux data must be filtered out of the dataset to limit the influence of anthropogenic activities or pastures surrounding the site (surprisingly, these statistics are never given in your paper nor in Nagy et al., 2006). It should result in huge data gaps that will increase the confidence intervals in your GPP and could potentially alter the seasonal evolution of this GPP depending on the gaps distribution from season to season or from year to year. The sentence: "At Brasschaat, GPP biased introduced by footprint-inconsistencies were low during the study period (7%)." does not help in this context. It is hardly understandable and footprint-inconsistencies effects on GPP are not discussed in the cited reference.

3) I'm surprised by the statement on page 7580 line 21 in the site description part ("Only few mature trees other than Scots pine are present ...") and the fact that you identify Brasschaat as a Scot pine site regarding GPP. According to Carrara et al. (2003) and to Nagy et al. (2006), the NEE obtained from this site should be seen as representative of a mixed forest. From Nagy et al. (2006) (Table 2, page 350), Pinus Sylvestris contribute between 54 and 60 % to the CO_2 eddy-flux, mature deciduous trees (mainly Quercus

Robur) having a contribution roughly between 25 and 30%. This point, added to the fact that under storey vegetation is non negligible at Brasschaat (as discussed by the authors on page 7591) and could bias the GPP estimation of mature Pines, raise some doubts about the GPP estimation for Brasschaat and therefore about the remarkably low NPP to GPP ratio (17%) for this pine stand.

I think that these questions are all in the scope of the paper and should be addressed to strengthen the presented results.

I also note that previous estimates of NPP to GPP ratio for the Brasschaat site are far away from yours. Indeed, Nagy et al. (2006) propose a ratio of 0.47 (in their abstract).

I recommend this paper to be published after the authors have taken into account these remarks (major revisions).

I agree to have a look at the revised manuscript.

Specific comments:

P7581L22: the exact method of flux partitioning is not given. I guess that it's the short term air temperature regression from Reichstein et al. 2005. The reader is not necessarily aware of the "recommodations of the euroflux network".

Technical corrections:

P7577L12: "on the fate of" instead of "on the fate on".

P7578L16-19: "Modelling C allocation . . . environmental stresses". This sentence adds nothing new. You already described the difficulty of C allocation studies in the previous page. You can simply delete the sentence.

P7582L6: ". . . consecutive estimates of circumference using allometric relationships between circumference and standing biomass and C content": replace the first "and" by a comma.

P7586L5: avoid the use of the minus sign to present a ratio. This could be confusing.

P7588L13: replace "remarkable" by "remarkably".

P7593L21: ". . . whereas at Brasschaat most of the trees removed were suppressed". I don't understand this sentence.

Fig.2: a "C" is missing in the left y title.

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