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Comment

## ***Interactive comment on “Decadal water balance of a temperate Scots pine forest (*Pinus sylvestris* L.) based on measurements and modelling” by B. Gielen et al.***

### **Anonymous Referee #1**

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General remarks: The authors present an assessment of water balance components based on long-term measurements and modelling. As the authors stated long-term data sets are rarely available to study interannual variability of water balance components. So, this paper is a sophisticated analysis including 10 years of hard work in obtaining high quality EC measurements. But I suggest to change the title from Scots pine forest to a mixed coniferous/deciduous forest because in my point of view the footprint of the EC measurements at the given height should be much larger than 2ha only. This has maybe implication on the used parameter values of the models and on the modelled evapotranspiration. Furthermore, I can't follow the decision not to do the latent heat flux correction using the energy balance closure gap according to

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Amiro (2009). In the conclusions of Amiro (2009) one of the statements is: “However, experience at other sites with poorer energy closure indicate that the residual may over-estimate ET by about 5%, which adds some uncertain bias.” In my point of view an overestimation of 5% is better than an underestimation of up to 37% (acc. to the energy balance closure of 63%). On an annual or monthly basis a possible approach of the latent heat flux (LE) correction could be the partitioning of the energy balance closure gap according to the bowen ratio (br) and the correction of LE as follows:

$LE_{corr} = LE + (1/(1+Br)) * \text{closure gap} * \text{available energy}$ .

with  $LE_{corr}$  - corrected LE; LE - uncorrected LE; Br - Bowen ratio.

This could be a better EC based ET estimate than LE itself or AE-H (difference of available energy and sensible heat flux). At least I think the energy balance closure gap should be regarded as the main reason for the differences of EC based ET and modelled ET. The labelling and legends of Fig.6-10 are too small. Overall, the topic of this paper is relevant to the field of this journal.

Others in detail: P10523L19: “16m a.s.l.” instead of “16m” P10524L11: “gaseous concentrations” instead of “gaseous fluxes” P10528L16-17: declare the biomass and soil values used for the model P10503L12-13: which consequence has a change of the 2mm value to e.g. 1mm or 3mm? P10540L1: “Grünwald” instead of “Grunwald” Tab.1: indicate the time step (based on annual values) Tab.2: indicate the time step (based on annual values) Fig.4: based on daily values or mean monthly values like in Fig.5? Fig.6: “without” instead of “sans”

Interactive comment on Biogeosciences Discuss., 6, 10519, 2009.

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