

## ***Interactive comment on “Characterisation of ecosystem water-use efficiency of european forests from eddy covariance measurements” by F. G. Kuglitsch et al.***

### **Anonymous Referee #2**

Received and published: 11 February 2009

This paper presents interesting data, findings and analysis, but lacks clarity in some of the text sections as well as in the figures that limit its scientific significance in its current form

This paper should only be considered for publication with the major revisions. The revisions are necessary in the eyes of this reviewer to improve clarity of the presentation and needed to make a convincing scientific argument. In its current form to paper is especially hard to follow in the results and discussion sections of the text. The language in those sections needs to be thoroughly edited. Sentences tend to run on and are too complicated. Sentence structure needs to be revised in the results and discussion

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sections.

While the paper notes that GEP is the canopy function of interest but not directly measured in the introduction, it neglects to emphasize this fact sufficiently in the later discussion of the analyzed data. The description of the CarboEurope IP data set is short but sufficient; however the description of the gap filling algorithm used should be extended to include more details. This is especially noteworthy since the authors mention the reliability of data in one of the figure legends. The limitations of using GPP versus NEP need to be discussed in more detail since calculating WUE with GPP is likely most sensitive to the respiration algorithm used in the data preparation. The use of a unified data set removes some of the uncertainties that come with site-specific respiration models, but respiration term is generally much larger than the NEP term and any estimate of GPP is largely based on the modeled respiration. While there is no way around this matter when using EC based data sets the implications need to be assessed in this paper when making any conclusions in the analysis. Some more detailed notes are attached.

Notes on Tables:

1. The site specific parameters are too sparse. Additional information should be listed including: Stand age, LAI, understory LAI, and management type. Especially age and LAI might be of significance here. Water use is likely a function of canopy LAI and canopy structure. 2. What do the authors mean with "less than 80% [...] were original or reliably filled."? How do they define reliable? What are unreliably filled data? There should be no completely filled data in the regression models and this legend could lead one to believe that some data points could be days made up of completely filled data. The wording needs to be more precise and an absolute limit needs to be set for the amount of filled data allowed per day like one or two missing hours otherwise the day should be rejected. This should be done regardless of the confidence in the filling method. If the authors disagree they should give a sensitivity analysis to justify their position. 3. Are these data mean daily values? Please clarify.

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## Notes on figures:

1. Which calculations are used in this paper? This should be clarified. The epsilon character does not show in the legend, please fix this. 2. What does an average day consist of? Here the author gives R2 instead of R as in a previous table. Why? Please be consistent. The equation should not be included inside the graph but rather in the legend or in a separate table. 3. Why are only Hyytiala data shown in figures 2 and 3? Equations in the figure please see last figure's comments. 4. This graph is misleading as the points are connected. Is there any significance to the connecting lines? This graph contains a lot of information but is hard to read. Maybe panels for the different functional types would be a good way of grouping the data. How are data gaps related to rainy days (EC equipment tends to malfunction when rain occurs)? What impact would this have on the results shown? 5. Why did authors choose this subset of sites here? 6. This graph is again hard to read. The background grid is making the graph harder to read, especially since there are more than two horizontal lines, which are stated to indicate the means in the legend. Please consider reformatting this figure into panels or make other changes. 7. How are the sites shown chosen? How are they representative? Would it make more sense to show the composite of multiple sites for each functional type? 8. What sense do the mean diurnals make here? The authors have just shown that there are significant seasonal changes in the previous figure. Does this figure show a specific season or average over the whole year? In the latter case there is little sense in showing the data in the opinion of the reviewer as the author's average over significant seasonal changes. Error bars should be given and panels for each site might be preferable. 9. Why again a subset of three sites only?

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Interactive comment on Biogeosciences Discuss., 5, 4481, 2008.

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