

## ***Interactive comment on “Water use strategies and ecosystem-atmosphere exchange of CO<sub>2</sub> in two highly seasonal environments” by A. Arneth et al.***

**A. Arneth et al.**

Received and published: 23 June 2006

Thank you, Tuomas, for your comments on our manuscript, and for your suggestions to improve it. The caution you asked for with respect to the observed spring respiration peak is well taken (p357), and in the revised test of the manuscript we stress that without additional chamber data this aspect is mostly speculative. We open the revised paragraph with: "From NEE data alone one can only but speculate whether the observed step-increase in respiration rates early in the active season may be a general feature of deciduous forests irrespective of their growth environment or leaf-type." And the last sentence in the revised manuscript reads: "Still, separate cuvette measurements on soil, stem and leaf level would be required to investigate these processes in more detail." However, as discussed in the text our observations fit with soil laboratory experiments and with other flux studies. The birch forest had some evergreen under-

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

story vegetation (small, regrowing fir, as outlined in Röser et al., 2002; as well as some evergreen dwarf shrubs); onset of photosynthesis in this evergreen understory would have buffered the observed increase in (positive) NEE (and thus respiration) rather than caused it. Aurela et al observe this onset of photosynthesis in the understory as a small, but distinct signal; this was not the case for the Siberian forest - likely because the proportion of evergreen understory at the Finnish site was higher. In terms of comparison with other flux data (p 360): there is of course a wealth of flux data available (reported as daily values) to compare our data against; indeed, this comparison has been done already in the earlier publications from the sites and we did not think it appropriate to repeat this comparison in the present manuscript - since it indeed was meant as original analysis. What we wish to stress in this paragraph is the large number of study sites that is required to arrive at a convincing pooling of ecosystems by biome or phenology in terms of their carbon fluxes since effects of disturbance history and ecosystem age can have a major influence. There is most likely also a difference between sorting or pooling ecosystems in terms of their NEE vs. doing so by assimilation and respiration - same NEE values can be the result of very different rates of A and R, as demonstrated in Table 1. Figures 1 & 2 will be revised, also in response to the first reviewers comments. The caption to Figure 7 has been revised to clarify which symbols refer to which site. P352, night-time rates: yes, stratification at night is usually stable; we meant specifically the rates above the specified  $u^*$ -threshold. We clarify this in the revised version of the text.

---

Interactive comment on Biogeosciences Discuss., 3, 345, 2006.

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)