Biogeosciences Discuss., 6, C4057–C4059, 2010
www.biogeosciences-discuss.net/6/C4057/2010/

Biogeosciences Discussions

Interactive comment on "Partitioning of catchment water budget and its implications for ecosystem carbon exchange" *by* D. Lee et al.

Anonymous Referee #1

Received and published: 20 January 2010

This study by Lee and colleagues is of large interest for an improved understanding of water and carbon cycles on land. The authors aim at (i) partitioning evapotranspiration at catchment scale into the component fluxes soil evaporation, interception and transpiration, and (ii) estimating gross or net primary production based on the relationship of both carbon and water fluxes (water use efficiency). Such study would complement existing large-scale water and carbon flux estimates, such as derived from remote sensing of the vegetation or inversion of the transport of atmospheric CO2 content. This is a highly relevant scientific question within the scope of BG.

However, there are some major issues that need to be thoroughly addressed prior to a publication in Biogeosciences.

(1) In the title, abstract and introduction it was make clear that one major objective

Full Screen / Esc
Printer-friendly Version
Interactive Discussion
Discussion Paper

of the study is to estimate GPP or NPP by combining the estimated catchment-scale transpiration with a mean water use efficiency value. In contrast to this aim no such results were presented but only a discussion of estimated WUE values in the region. Either you redefine the objectives of the paper, e.g. only concentrating on the water flux partitioning, or you add upscaled WUE fields to your results and use it for estimating the mean GPP or NPP of the whole watershed. In any case, the first strategy would decline a scientifically very interesting result.

(2) Estimation of Es is based on theories from open water bodies. It is totally unclear to me if the concept can be directly transferred to catchments or not and you also do not discuss this issue. For example, do transpiration and interception also fractionate 18O? And if so, does this not influence Es towards an overestimation? In line 4 of page 11406 it is stated that such method was applied for a number of catchments. If so, please give at least 3 good references, and please enhance the discussion about your water flux results.

(3) Estimation of interception. Please, explain more carefully equation 4. What are beta and D, how did you estimate it, what is the variability among plant species and LAI? I would expect LAI to having a large effect on interception.

(4) You present long data series of water fluxes in the tables which is quite interesting. But it seems that these are just based on the P and Q time series and isotope measurements were taken from a much shorter time period but applied to the full period from 1966-2007. Please clarify. I think you can just present the time period where all measurements are there.

(5) Please, revise your paper in terms of its partition into methods, results and discussion. For example, section 3.3 starts with methods.

Minor comments:

The area is highly populated (P11404 L 11) thus can you really assume dS=0? I would

BGD

6, C4057–C4059, 2010

Interactive Comment

expect a great water usage of the people, e.g. also for irrigation?

Tab 1: Source of P, Q?

Tab 2,3; Fig 3,4, 5: Valid for which time period?

Why is Fig 5 needed if no further application of this relationship is presented?

Interactive comment on Biogeosciences Discuss., 6, 11401, 2009.