

Interactive comment on “Global, Satellite-Driven Estimates of Heterotrophic Respiration” by Alexandra G. Konings et al.

Anonymous Referee #2

Received and published: 14 February 2019

Konings and colleagues aimed to derive global, satellite-driven estimates of heterotrophic respiration.

Here already lies the problem with the manuscript: Konings and colleagues focus too much on deriving the individual ecosystem fluxes that make up Rh top-down. GPP is derived from sun-induced fluorescence (top-down), but the uncertainty from using bottom-up estimates such as FLUXCOM is not evaluated. To my mind it should not matter if all fluxes that can be used to derive Rh top-down are also top-down estimates. Instead of using GPP from SIF also FLUXCOM-GPP (bottom-up) could be used – would that make a difference regarding spatial patterns?

For NEP the authors should discuss the effect of different products, for example Jena CarboScope NEP (<http://www.bgc-jena.mpg.de/CarboScope/>) or Chevallier et al.

(2010) or FLUXCOM (Zscheischler et al., 2017) (how problematic this may be).

On a similar note, one can get an estimate of Rh from CARDAMOM: this should be very much dictated by data. How does Rh from CARDAMOM compare to the satellite-driven estimates and Hashimoto's approach?

How different would global numbers be if NEP was 0 globally? Would spatial patterns change a lot? It seems like that due to the coarse NEP estimates you cannot achieve reasonable resolutions for Rh.

Overall, I cannot follow why we need such a coarse estimate of Rh. On page 14 line 7-8, the authors state that estimates of Rh can be helpful as a validation for ESMs. Using Ecosystem respiration as a validation would be enough to my mind. One evaluates temporal and spatial patterns of Reco to deduce if the representation of Ra and Rh can reproduce these patterns. In the approach presented here one ends up with partitioned Rh, but this heavily depends on the prescribed CUE.

Technical and other comments:

Page 7, line 13: Hashimoto et al. (2002), I think this should be 2015.

Figure 5: In the map there are yellow colors. In the RGB legend, however, yellow cannot be seen. Please correct.

References

Chevallier F, Ciais P, Conway TJ et al. (2010) CO₂ surface fluxes at grid point scale estimated from a global 21 year reanalysis of atmospheric measurements. 115.

Zscheischler J, Mahecha MD, Avitabile V et al. (2017) Reviews and syntheses: An empirical spatiotemporal description of the global surface-atmosphere carbon fluxes: opportunities and data limitations. *Biogeosciences*, 14, 3685-3703.

Interactive comment on *Biogeosciences Discuss.*, <https://doi.org/10.5194/bg-2018-466>, 2018.

Printer-friendly version

Discussion paper

