

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 R_h 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 R_h 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.

C1

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

On a similar note, one can get an estimate of R_h from CARDAMOM: this should be very much dictated by data. How does R_h 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 R_h .

Overall, I cannot follow why we need such a coarse estimate of R_h . On page 14 line 7-8, the authors state that estimates of R_h 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 R_a and R_h can reproduce these patterns. In the approach presented here one ends up with partitioned R_h , 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.

C2