RESPONSE TO REVIEWER 2

My most important comment is that the manuscript would benefit from detailing the limitations that are intrinsically linked to the employed RS dataset. Especially, the identification of the impact of land-cover transitions on LE are based on the MODIS evapotranspiration (ET) dataset. Michel et al. (2016) have compared the performance of four ET datasets – including MODIS – against flux-tower data, and identified substantial limitations of MODIS. In a parallel effort to evaluate these datasets against independent ones (such as river discharge data), Miralles et al. (2016) showed that MODIS was performing worst across most ecosystems and climate regimes. This points at uncertainties on the LE (and therefore H+G) data from the RS dataset, which have been appropriately mentioned by its authors (Duveiller et al., 2018, Nature Communications). However this manuscript offers the opportunity to repeat these while specifically addressing to the community of land surface modellers. They should therefore be mentioned in the discussion here as well.

We agree. We added this point in explicitly in the discussion.

The reanalysis data used to force the LSMs are subject to considerable errors and uncertainties, especially over data-poor regions. These errors can eventually significantly impact the components of the Surface Energy Balance simulated by LSMs, for example LE. LUMIP activities (Lawrence et al., 2016) for example plans to investigate the repercussions of these for the biogeophysical effects of land-cover transitions. This therefore constitutes a limitation of the methodology employed by Duveiller et al., which I recommend to mention in their manuscript.

We agree. We have made an explicit mention of this in the last paragraph of the discussion section and suggested the presented framework could be adopted or extended by LUMIP to explore the sensitivity of the results to the input data.

In the introduction, the authors mention that “a vegetation cover transition from forest to grassland typically causes [: : :] a decrease in summer evapotranspiration (because grasses typically have shallower roots and thus cannot access water in deeper soil horizons”. A lower aerodynamic conductance is another possible explanation for this behaviour (see e.g. Bonan, 2008).

Indeed. We have added this point.

From reading the Methods and especially Table 1 it seems to me that the Grasses and Crops simulations are the same in JSBACH and ORCHIDEE. Could the authors please confirm in the text if this is the case, or clarify their descriptions in the opposite case?

There was a mistake in table 1 which we have now corrected. The grasses and crops simulations are NOT the same in JSBACH and in ORCHIDEE.

Section 2.1, line 29, “consist”. Please check the grammar

Done

Section 2.4, line 15. Consider replacing “remains numerically” by “remains numerically unchanged”?

Done

Section 3, line 29, “it is a good example of how this is a process-based evaluation”.
Please reformulate

Done