

AC: We would like to thank the editor for his insightful comments and suggestions, which we believe have improved the quality of this manuscript.

EC: Sentence 2 of the Introduction – can this reference be updated? The 2008 report is now referring to simulations from a decade ago

AC: The reference has been updated.

EC: Page 2Line 24 – leaf area index mentioned but not abbreviated; in the abstract LAI abbreviation is used but not defined .. please check use throughout of acronyms

AC: This has been modified in the text.

EC: Currently the paper sections 2-5 are methods and then section 6 serves as both results and discussion. It therefore remains difficult to link specific aims, approaches and findings through the manuscript. Currently at the end of Page 3 a general aim is given, and then some methodological/approach type statements. I believe this could be strengthened to better allow the reader to link specific objectives in the introduction to approach and then to findings. For example, ideally sub-headings in Section 6 would map to specific aims/objectives made clear at the end of the introduction. This ensures the reader can more easily navigate the different aspects of the paper from start to finish.

AC: We have clarified the specific aims of the paper and sub-headings on section 6 have been adapted to these aims.

EC: Section 4.2.2 – the abstract and introduction makes reference to remote sensing as a key component of the study, yet the sub-headings don't make clear where this aspect of the study is described. I assume it is this section 4.2.2 – can its sub-heading be made more clear/specific? Or perhaps an introductory paragraph in Section 4.2 to overview/summarise the range of data used to paint a clear picture early on?

AC: Section 4.2.2 heading has been changed to : “4.2.2 Remote sensing input data: vegetation properties” to match it to the previous section heading: “4.2.1 Micrometeorological input data”

EC: Section 5 – I think this section is currently not ideal as a major heading – can it instead be included in Section 3 or 4 with some minor changes to sub-heading titles? Also, because this section is attached at the end of the model and data sections, it

remains unclear what is being evaluated by these metrics. It is stated that “The performance of the TSEB model and possible refinements for Arctic tundra was evaluated ...” ... but at this point of the paper it is unclear what this means. Can you please re-word and better link this section to specific variables being modelled/measured, and how it is used to compare model approaches – this may be helped if it is incorporated in section 3 or 4.

AC: Section 5 has been merged to section 4 and we have improved this section text accordingly. We detected a typo on Eq. 24 that has been corrected.

EC: Section 6.3 – I have followed up with Reviewer 2 about RC_12, relating to closure of the energy balance. After consultation, I believe this section is still not satisfactory in making clear the issue of error accumulating in the residual term. Because we do not understand where the error is coming from (instrument, advection, footprint, radiation, soil heat flux, etc.) then it is not appropriate to try and force the energy balance to close. Calculating LE as a residual puts all of the error in the LE term which is unacceptable and could be misleading. Due to the uncertainty in the source of error and the fact that there may be biases in any particular term in the energy balance, it is not appropriate to force energy balance closure either. The conservative approach is to use the original data and not force to energy balance to close. This section should be updated and improved bearing this in mind.

AC: We have modified this section comparing our results with the original LE eddy covariance values (without imposing balance closure); therefore, using the conservative approach suggested by the reviewer and the editor.

However, we note that closure corrections are common practice in the literature when comparing surface energy fluxes methods, and in comparison with unclosed comparisons, provide bounds on the range in probable model error. We, therefore, would like to retain discussion of the closure comparisons. These results facilitate comparisons between our findings and other existing studies where impact of closure has been evaluated.

EC: Acknowledgements – Please consider acknowledging the help and inputs by the reviewers during the discussion process (should you believe it was helpful in improving the manuscript!)

AC: We really think both reviewers have helped to improve the text. An acknowledgement has been included in this section.