

Interactive comment on “Simulating shrubs and their energy and carbon dioxide fluxes in Canada’s Low Arctic with the Canadian Land Surface Scheme Including biogeochemical Cycles (CLASSIC)” by Gesa Meyer et al.

Anonymous Referee #2

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General comments This manuscript addresses a plant functional type which is central to the functioning of many sub-Arctic and Arctic systems, but which is often overlooked. Thus, the objectives of this work are important and highly relevant to efforts to improve our understanding of Arctic carbon balance. I find this manuscript well written and clear and the work high quality. The model modifications described are well justified, and the methodology is broadly sound and appropriate. While in places I feel the text could benefit from some extra reader-guidance to navigate the length and detail of the manuscript (e.g. more subheadings), or perhaps from some editing to make the

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discussion and parts of the results more concise, I have no substantial concerns with regard to the quality or communication of the work.

Specific comments Methods – Measurements and data processing: Some extra sub-headings would be helpful here, e.g. to separate out EC set up, soil chamber set up and CLASSIC runs. Soil chambers – did these remain closed throughout the summer and winter? If so, how did you prevent CO₂ build up above ambient, chamber heating and other artifacts? How did you measure and account for any artifacts of taking repeated measurements in unvented chambers? Detrital pool: Does the lability of litter differ between different functional types?

Technical corrections/suggestions Abstract L1: Large mouthful for a first sentence! Maybe condense slightly to something like: The Arctic is warming more rapidly than other regions of the world, leading to ecosystem change including shifts in vegetation communities, permafrost degradation and alteration of tundra surface-atmosphere energy and carbon (C) fluxes, among others changes. L61 change ‘,’ after tundra to ‘.’ L63 ‘,’ after diverse Table 2: Really useful table, but would it be too disruptive to have a brief description for each parameter either in a table column or in the legend? Not critical and I know its reader laziness, but it would be extra helpful!

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