

Interactive comment on “Validating a 1-D SVAT model in a range of USA and Australian ecosystems: evidence towards its use as a tool to study Earth’s system interactions” by G. P. Petropoulos et al.

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R3C1: Figure 1 was published in several papers by the authors already. Will there be a copyright issue to publish it again? Is it necessary to include it here? ANS: We agree with the reviewer that the figure may not be necessary and have removed it from the manuscript.

R3C2: This study evaluated the model for only 72 days. This is definitely not enough. It has to be at least several years. ANS: We appreciate the reviewers concern expressed

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in the comment above. We would like to underline here that only days of complete measured data were included in the EBC estimations, days with gapfilled data were rejected. Furthermore, in regards to the other comment of the reviewer related to: “For the stated aims of the manuscript (an in-depth validation of the model), simulations should be undertaken for all periods (day-time, night-time, clear skies, cloudy skies, precipitation, all seasons, etc.) with valid observational data.” we also agree that this is of course a valid criticism although though unfortunately unavoidable since reliable validation data under all conditions would be unavailable. Eddy Covariance data (LE and H components) used as observational validation data are subject to strict assumptions such as sufficient turbulent mixing, appropriate atmospheric thermal structure etc. Particularly for open path sensors scattering of infra-red signals by water droplets precludes measurements during precipitation events being retained for example and nighttime data are often plagued by insufficient mixing due to low friction velocities. Strict quality control typically rejects data collected under unfavourable conditions resulting in no data being available for model validation during these times. Continuous long term Eddy Covariance datasets that extend across these conditions do so only by being themselves modelled (gapfilled) from higher quality measurements. It is these higher quality measurements that have been used in the validations in this paper with short term assessments of energy balance closure being used to determine the suitability of these validation days. It is only by using these data that uncertainties in the observation data can be minimised and validations can be judged. Finally, in overall, many of the previously validation exercises on SimSphere which we have cited in our manuscript herein (but also in other similar studies to ours implemented to other models) have used “selected” days only to validate the model performance (e.g. days of stable atmospheric condition, non-convective conditions etc) and our practice here is in line to those studies as well and we do believe it is only fair to the model to validate it under conditions which it is able to simulate or take into consideration as otherwise cannot be expecting the model to replicate a reality which hasn’t been taken into consideration into its architectural design in the first place.

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R3C3: Figure 4 to Figure 9: These figures can be combined into just one figure. ANS: We agree with the reviewers' suggestion and we have now combined all our figures into a single one and have used individual letters to refer to the individual descriptions of each figure within.

Interactive comment on Geosci. Model Dev. Discuss., 8, 2437, 2015.

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