

## ***Interactive comment on “Implementation of a soil albedo scheme in the CABLEv1.4b land surface model and evaluation against MODIS estimates over Australia” by J. Kala et al.***

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General comments: This paper describes and evaluates the CABLE land-surface scheme with respect to predicting albedo. The authors also propose a soil albedo parameterisation and evaluate its performance in CABLE with respect to MODIS data. However, the parameterised albedo performs somewhat more poorly compared to the prescribed albedo. Although I think the paper has definite merit and should eventually be published, it is not clear why the authors did not trial a statistical parameterization as well, or possibly tuned the soil colour dataset to achieve better agreement with the MODIS dataset. If this issue could be addressed, then I recommend the paper for

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publication in GMD.

Reply: We considered this comment at length and concluded that this would be a really valuable addition to our manuscript. We have now tuned the soil color to CABLE soil moisture, and extended the soil colors from 8 to 20, which has improved the comparisons against MODIS and SPOT albedo estimates.

Specific comments: 1) Although the analysis of the new parameterization is valid, the proposed soil albedo parameterization seems to fail in a similar way as for BATS. Can the authors suggest a context where the parameterize scheme would have an advantage compared to the prescribed soil albedo? Alternatively, could the authors trial a ‘statistical’ approach which may achieve their goal of improving the model parameterization.

Reply: We have not trialed a statistical approach, but re-calibrated the soil color map to CABLE soil moisture, which has reduced the large differences in the NIR albedo. Please see the revised results and discussion section.

2) Is it possible to estimate errors for the observed soil albedo (i.e., using alternate datasets), or some measure as to what accuracy would be sufficient for the new soil albedo parameterization.

Reply: We accept this criticism and we now employ an alternate Albedo dataset, the SPOT product.

3) Is it possible to derive a soil colour dataset which would be more consistent with the MODIS data? Possibly this parameter could be adjusted to improve the consistency with MODIS?

Reply: Yes – thanks for this suggestion. We have carried this out. See the revised results and discussion section.

Technical corrections: Appendix A: Equation (A1) – Authors should mention that A1 assumes equal partitioning between shortwave and longwave radiation.

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Reply: We make it clearer that  $\alpha_s$  in A1 is the surface albedo for shortwave radiation, as described in Kowalczyk et al. (2006).

Fig 1: Text for "Fraction of direct-beam shortwave radiation" seems incomplete.

Reply: The text has been fixed in Fig 1.

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