

## ***Interactive comment on “Improved representations of coupled soil-canopy processes in the CABLE land surface” by V. Haverd et al.***

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This paper is representing several improvements to the coupled soil-canopy processes in the CABLE land surface model, especially a single-parameter drought response function to solve the decoupling of transpiration and photosynthesis fluxes under drying soil conditions. These improvements are important, and the estimations of the terrestrial carbon budgets and simulations of the ecosystem’s response to drought events would greatly benefit from this work.

The paper is well-written and clearly aligned with the goals of the Geoscientific Model Development Journal. I recommend its publication subject to some questions on the technical details.

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[Discussion paper](#)



1. Eq. (7) differs from original root shut-down function of Lai and Katul (2000). In the original function,  $\alpha_1(\theta)$  is a product of two items and its value will be 1 if the soil is saturated. However, Eq. (7) does not adhere to this feature, that does not seem reasonable. Why?
2. Would Eq. (8) experience a “division by zero” error? How to avoid this error?
3. Eq. (4): Is the coefficient 1.1 necessary, while  $(\theta_j - \theta_w)\Delta z_j$  represents the water available in the  $j^{th}$  soil layer?
4. Eq. (14): Please describe the variable  $c_{sw}$ ? Also in Eq. (17) and Eq. (33).
5. Eq. (28): Please describe the variable  $\Delta x_1$ ?

Some specific comments:

1. Page 1, Line 19: global Eddy covariance flux network → global eddy-covariance FLUX NETWORK.
2. Page 3, line 10: (2011)(CABLE1.4b) → (2011) (CABLE1.4b). Missing space.
3. Page 9, line 13: (21) → (21). Italic fonts.
4. Page 9, line 17: 2.38 m s<sup>-1</sup> or 2.38 m<sup>-1</sup> s? Please check the unit. Also please correct the minus signs on this line.
5. Page 10, line 22:  $h_{min} = 10^{-6}$  or  $\phi_{min} = 10^{-6}$ ? Please check it.
6. Page 13, line 14: 0.01-0.12 → 0.01–0.12. hyphen → en dash.