

Interactive comment on “Disentangling the response of forest and grassland energy exchange to heatwaves under idealized land–atmosphere coupling” by C. C. van Heerwaarden and A. J. Teuling

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We believe that by means of our previous comments, we have responded to the reviewers' concerns.

In order to address their shared concern, the model used to describe the vegetation response, we have created a new figure that shows the total stomatal resistance response to the heating. Within our model, also the grass responds to the heat waves, with a resistance increase between 10 and 20 percent.

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After creating this figure, we agree with the reviewers that we might have overemphasized the role of VPD, because in the typical parameterizations that are being used in atmospheric models, the set of functions that in the end lead to the stomatal resistance cannot distinguish the temperature effects from the VPD effects. These two variables tend to be strongly correlated, with high VPD values mostly occurring during spells of high temperatures. As our figure shows, the VPD response that the reviewers expected are mainly taken into account through the response of the stomatal resistance to the temperature. Therefore, the typical parameterizations that atmospheric models use might be mechanically wrong, but still leading to the correct atmospheric temperatures and humidities.

We propose the following. Rather than stressing the role of the VPD, we suggest to rewrite our discussion focusing on the role of biology in general. We believe that one of the main findings of our paper, namely that the active behaviour of the vegetation is the crucial factor in explaining the data, still holds. We will introduce a deeper discussion on the role of biological processes and link it better with existing literature on the response of the stomatal resistance to the VPD. In addition, we will explain in more detail when the runaway feedback that we discuss can occur and why forest crosses the threshold during the heat waves and why grass does not.

With this, we hope to have addressed all the reviewers' concerns.

Interactive comment on Biogeosciences Discuss., 11, 5969, 2014.

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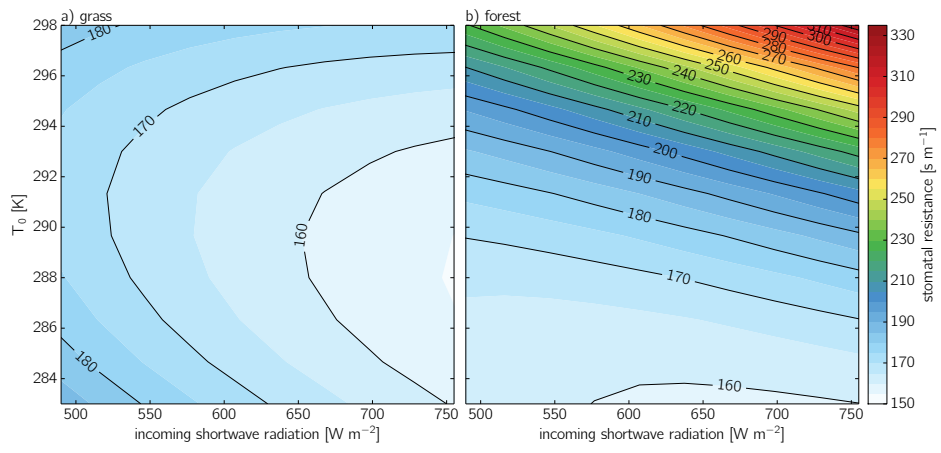


Fig. 1.

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