

Interactive comment on “Response of vegetation to the 2003 European drought was mitigated by height” by S. L. Bevan et al.

W. Buermann (Referee)

w.buermann@leeds.ac.uk

Received and published: 29 November 2013

Title: ‘Response of vegetation to the 2003 European drought was mitigated by height’

Authors: Bevan SL, Los SO, North PRJ

The objective of this study is to quantify how vegetation height has mitigated the influence of an extreme heat wave in Europe on vegetation dynamics. To my knowledge, this is the first study that made use of novel satellite data sets (e.g. vegetation height from GLAS and DTR from MODIS) in order to gain additional insights. Overall, the study is thoughtfully executed and the manuscript is generally well written, and in my humble opinion does provide a valuable contribution. Specifically Figure 8 shows illustratively how vegetation responses are affected by warmer droughts, which based on

C6892

projections will increase in the future.

I thus feel that after some changes intended to improve interpretations of the key results mainly (outlined below), it could be suitable for publication in BG.

Major comments:

(1) Interpretations of correlation pattern NDVI-Rainfall versus NDVI-Temperature, respectively (Fig. 2 and 3). The main goal here is to ‘investigate the contribution of each parameter to summer NDVI variability’. It is argued that the larger correlations for rainfall-NDVI suggest that rainfall is more important for summer NDVI than temperature. This inference based on correlation analysis only is quite limited as this outcome may be purely a result of rainfall being simply more variable at interannual time scales than temperature. In addition, the mentioned strong covariations between temperature and rainfall further reduce interpretability in regards to which factor is more important. I thus doubt if the results shown in Fig.2 and 3 thus contribute much and I suggest working over corresponding objectives and interpretations in light of these remarks (or moving into a supplement).

(2) Interpretations of correlation pattern vegetation height versus NDVI and DTR (Fig. 6 and Fig.9). A missing piece here is why there is a notable lack of such correlations in areas that also show strong negative NDVI anomalies during summer 2003 (Fig.1) such as in southern France and Eastern Europe?

(3) Interpretations of results shown in Figure 8: I view this figure as a key result (see above), but the accompanying interpretation is again somewhat limited. What does it really mean if the trend slopes of the shown relationships change as a function of temperature anomaly levels?

(4) Interpretations of results in Figure 9: The MODIS based DTR is a satellite based surface temperature measurement. For readers not familiar with satellite surface temperature retrievals it would be helpful to provide more information on these measure-

C6893

ments (e.g. how is it different from surface based temperature measurements) and also add more details in regards to interpretations of the corresponding results shown in Fig. 9.

Minor comments: (1) Page 4, line 25-30: Seven models participated but only 6 show changes in near surface climate in land cover change scenarios?

(2) Page 5, line 10-15: Would not mention the key results of this study at the end of the introduction, but rather state objectives/hypotheses.

(3) Page 9, line 7-10: I suggest to keep the order of the Figures in numerical sequence (avoid jumping from Fig. 6 to Fig. 9)

(4) Page 11, line 1-8. At the end of the discussion there is a passage that is neither referenced nor integrated with the current findings. In the conclusion, this is done to some extent (til line 21), but I suggest to rework these passages to more clearly differentiate what is discussion and what are the conclusions of this study.

(5) Page 11, line 18-21. Not clear how results of this study support the mentioned studies by Zaitchik and Teuling & Seneviratne? Please clarify.

Dr. Wolfgang Buermann

Interactive comment on Biogeosciences Discuss., 10, 16075, 2013.