

Response to comments Referee #2.

### Major Comments

Ref 2: (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).

*Reply: We agree that the inference that rainfall is more significant based on correlation analysis is limited and we do mention that decreases in rainfall and increases in temperature are linked. However, as we also mention, the results support earlier findings based on much shorter time series. We think it is important to keep the maps (Fig. 2) in the text as they indicate the geographic pattern of climate influence on NDVI and indicate agreement with earlier studies. We can move Figure 3 to an appendix if the editor requests.*

Ref 2: (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?

*Reply: We added to the discussion of the patterns of DTR correlation with vegetation height in more detail, we repeat our response to RC6701 first main comment: “ We expanded our analysis of the DTR, additional figures showing the DTR for non-drought years are included in the appendix and are discussed in the text (see plots of the correlation between DTR and vegetation height for 5 August 2002, 2003 and 2004). For these three periods we also included the corresponding GPCP precipitation of the preceding 32 days, and the MODIS LST. The figures of non-drought years show no difference in DTR between short and tall vegetation. Over France and Germany, in particular, the spatial extent of the DTR correlation with vegetation height appears to depend on the presence of above average temperatures more than a precipitation deficit, although it should be noted that precipitation is generally more variable in space and time.”*

*We included in the appendix maps of precipitation and temperature for other years showing their possible influence on the spatial patterns of the correlation.*

Ref 2: 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?

*The discussion of this Figure is expanded; the slopes of the relationships are larger when the drought intensifies and smaller for less severe droughts. This is in agreement with an absence of the signal (zero slope) in the DTR during non-drought years..*

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 measurements (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.

*Explanation of MODIS-based DTR measurements is added in the data section.*

#### 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?

*That is correct, one model did not show a change; this is added.*

(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.

*Agreed, this is deleted.*

(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)

*Agreed, we moved Figure 7 to the end, and discuss Figure 9 before Figure 8.*

(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 cleanly differentiate what is discussion and what are the conclusions of this study.

*We rewrote the discussions and improved its cohesion, some of the text was moved to the introduction (in response to Referee #3), and some to the conclusions.*

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

*The text is revised and the results of these references are better integrated in the Discussion.*