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Biogeosciences Discussions

Interactive comment on "Analyzing the causes and spatial pattern of the European 2003 carbon flux anomaly in Europe using seven models" *by* M. Vetter et al.

Anonymous Referee #1

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The authors analyse model carbon flux response to the 2003 heat wave across Europe. The study confirms earlier work by Ciais et al, in that all models respond with a strongly reduced carbon uptake, but it provides some more insight about the large model-model variation in response to similar climate forcing, and about regional differences within Europe. The analysis has some very interesting aspects but in the present version of the ms. these are somewhat hidden behind lengthy, and in parts unnecessary, text. Tables 4 & 5 and Figure 2 provide a very clear overview over the chief model results. In my view there is no need to repeat so many of the numbers provided in the table in the accompanying text; section 3.1 could be reduced in length considerably (e.g., drawing the reader's attention to the model extremes, or briefly sum-

marising the chief model-model agreements and discrepancies). The authors state (page 1214/line9-13) that the overall model agreement on a negative NEP anomaly give high confidence in the modelled net flux response. But surely, by now terrestrial carbon models really should be expected to get the sign of the response to a severe soil moisture deficit, hot temperatures and high vpd right? I would be worried, indeed, about our ability to model terrestrial carbon fluxes if the model response to extremely hot and dry weather did NOT show reduced carbon uptake. What I fond much more noteworthy is the notable difference in the absolute values of GPP, R, NEE between the models. This is something the authors did chose not to comment on (focussing mostly on the anomalies) but in my view the manuscript could gain significantly by including these aspects in the discussion. Overall, the manuscript would improve considerably by a more in-depth analysis of what causes model-model differences (i.e., expand discussion presented of pages 1216-1218), and by concentrating not only on the summer months but on effects on annual carbon fluxes. Page 1216/line 14: how are fertilised grasses represented in models with no N cycle (ORCHIDEE, JULES)? What are 'supergrasses'? Page 1220/line 23: what is the ORCHIDEE anomaly for the months July -September in this study (by contrast to Ciais et al., 2005)? To my knowledge Ciais et al used ECMWF reanalysis to drive the model, whereas the present study used REMO forced with NCEP reanalysis. What is the effect of the climatology over the effect of simulation period? The language is by and large acceptable, but the manuscript will require a very thorough editorial reading by one of the native English speakers that are listed as co-authors. For instance (and the following list is by no means comprehensive): add article (e.g., the baseline, the GPP, the 1 sigma bound, etc.) 1212/line 8 & 18, 1214/line 15, page 1216/line 2; page 1213: On the other hand (line 6 & 16) - bad style (there's no 'on the one hand' or alike); page 1213/line11 "..showed a reduction of in (?) GPP.."; page 1214/1: The major..; page 1216/line 12&13: sentence unclear (what does 'was estimated' refer to?); page 1216/line 15: From what did Pixgro differ strongly?; page 1217/line13: drought not droughts (better still: soil moisture deficit! 'drought' is a very imprecise term); page 1217/line 26-29: sentence is incom-

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prehensible, page 1218/line4-9: unclear. Why is JULES decomposition dominated by temperature signal? Because of the root distribution used in this particular experiment?; page 1211/line 21/22: 2X ‘forests’; page 1212/line11-12: 2X ‘estimated’. Page 1210/lines 11-19: I count four sentences using nine times (!) ’anomaly’ or anomalies’ - surely even scientific English doesn’t have to be so bad in style!

Interactive comment on Biogeosciences Discuss., 4, 1201, 2007.