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Geoscientific Model Development Discussions

Interactive comment on "Modelling spatial and temporal vegetation variability with the Climate Constrained Vegetation Index: evidence of CO_2 fertilisation and of water stress in continental interiors" *by* S. O. Los

Anonymous Referee #2

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The author proposes an empirical model on NDVI based on temperature and precipitation. I am not convinced the method presented in the manuscript is of high interest.

My main concern is the very poor skills of the model. The model does an OK job simulating the broad spatial distribution of NDVI and its climatological seasonal cycle, but it fails to simulate interannual variability (figure 6 showing a poor fit between the model, CCVI and the observation, FASIR). The author shows that CCVI seems better than an earlier model, RVI, at least for interannual variability. Nevertheless, CCVI has a very poor correlation (r=0.255). I was quite surprising to read in the introduction "the RVI

reproduces spatial, seasonal and interannual variability well (Los, 2013)", when Figure 9 gives a coefficient of correlation of only 0.188. This is also clear from figures 8 and 9: both models (RVI and CCVI) do capture the mean seasonal cycle of NDVI, hence a good temporal correlation on figure 8, but completely fail to simulates anomalies from year to year.

Also, as already pointed out by the first reviewer, Colin Prentice, it seems illogical to develop a NDVI model that is not based on PAR, which, with leaf temperature and water availability, is the key control on leaf growth, and hence diagnosed NDVI. One can of course always train a model using observations over a given period with temperature and precipitation only, but I have serious doubts on the predictive skill of such model, lacking physiological foundations.

As a final note, I see GMD as a journal where new models are being described comprehensively, models equations being fully disclosed in such a way that a reader could, in theory, reproduce the same model. I think this manuscript is a long way from this standard. Section 3 is extremely hard to follow, and at the end, I couldn't picture what the equations supporting the model are.

Interactive comment on Geosci. Model Dev. Discuss., 8, 4781, 2015.