

## ***Interactive comment on “The inter-annual variability of Africa’s ecosystem productivity: a multi-model analysis” by U. Weber et al.***

### **Anonymous Referee #2**

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#### General comments

The manuscript identifies robust patterns of interannual variability of gross primary production (GPP) and net ecosystem productivity (NEP) using four dynamic vegetation models. The study represents the variability of the carbon cycle for the vegetation models in conjunction with remotely sensed indicators and their relation to different climate drivers in different regions of Africa. The methods are comprehensively explained. The analysis is informative, well-written and needs only small revisions.

The variability of NEP in dry regions is mostly driven by fire emission. Could you indicate why fire is not taken into account in the analysis, while 3 out of 4 models are including a fire model. Further the comparison of NEP with atmospheric inversion is

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difficult to evaluate. In many cases NEP changes the sign by fire emissions. Has fire been simulated in these 3 models?

Have all models been running with potential vegetation? This should be mentioned. I miss the influence of vegetation distribution on the carbon cycle. Are there great displacements within the investigation period?

#### Specific comments

4039, 3: What is the meaning of a heuristic approach for simulating vegetation distribution.

4044, 14: Does ORCHIDEE and JULES represent shrubs or a similar PFT to confirm this argument?

4044, 24: That could be explained by uniform distributed rainfall within the year in the inner-tropics. The good agreement of the four models and the remotely sensed data, as well as the seemingly heterogenous region of Madagascar should be emphasised here.

4045, 8: Are fire emissions the driving part?

4046, 3: Again: Fire influence variability of NEP is strong. Because fire occurs not regularly but rather due to different moisture conditions.

4048, 4: Why should light limitation only occur where phosphorous limits productivity?

#### Technical comments

PCA is not explained Fig.11 (S.4046) is mentioned before Fig. 10 (S.4047). PCA Mode 3 and Mode 4 are not further analysed. Fig. 8 is not convincing and difficult to read.

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