

## Review comments

This study presents a simple dynamic global vegetation model (SEDGES) to simulate ecological, hydrological and surface energy variables. The results showed that gross primary production is well simulated, and this model is useful to simulate large scale vegetation and land surface characteristics. However, there are several concerns that should be taken into consideration.

1. The SEDGES is based on the SimBA model, and the SEDGES builds upon SimBA by improving most of its parameterizations. Compared to the SimBA, SEDGES has four major increases in complexity. However, the authors should explain more about how they improve most of SimBA parameterizations and what's different between them.
2. The SEDGES uses "big leaf" formulation for vegetation CO<sub>2</sub> uptake, but why don't SEDGES use the individual plants and trees formulation to capture the outcome of competition for environmental resources?
3. SEDGES uses a constant NPP/GPP = 0.5 approximation, and only impacts biomass changes and the latter occur on very long time scales. The constant value might be difficult to capture the dynamic of ecosystem, especially on short term temporal dynamics.
4. In general, SEDGES has well spatial correlations but weak temporal correlation with reference datasets in GPP, LAI etc. For the model simulation, temporal dynamic is more challenged to capture, but it is important to understand the temporal variation of ecosystems. The authors should explain more about weak temporal correlation and how it affects the accuracy and uncertainty of the model.
5. In page 22 L11-15, the interannual variability of global GPP for 1990-2009 in SEDGES is 1.79 PgC yr<sup>-1</sup>, whereas it is 2.50 PgC yr<sup>-1</sup> for referenced dataset. This result means SEDGES underestimated the seasonal variations and phenology, and might be also limited to capture extreme climate events or disturbance.