

***Interactive comment on “The Jena
Diversity-Dynamic Global Vegetation Model
(JeDi-DGVM): a diverse approach to representing
terrestrial biogeography and biogeochemistry
based on plant functional trade-offs” by R. Pavlick
et al.***

Anonymous Referee #2

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This paper is a description and analysis of a new type of DGVM - one which selects its own plant growth strategies from continuous distributions in model parameter space. Vegetation parameters are carefully constructed to represent key trade-offs, allowing optimal solutions to dominate in each environment. This a fascinating approach, and has the potential to revolutionarise global vegetation modelling. Advantages are that diverse plant growth strategies are represented, making the model potentially able to respond to perturbations with much greater realism than models based on a handful

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of plant types, but without the perplexing difficulty of parameterisation. Because of the simulation demands of a mechanism for selecting from a vast number of potential strategies, many aspects of the model approach are rather simple, such as the calculation of GPP, and there is no treatment of competition. The curious thing, then, is that the model evaluation is largely based on key structural and biogeochemical metrics, most of which have little to do with the novelty of the approach put forward. The model does relatively well on key carbon cycling metrics (although the constant referral to two other models becomes at best tedious, and at worst annoying), for example, but this is presumably much less about the innovative ecological aspects than the parameter choices made concerning the very standard GPP, NPP, litter, and SOM parameterisations. This is a missed opportunity, as the really interesting point would be to see how well the model does in selecting the growth strategies over environmental space, and what we learn about which are the most important and how they vary spatially. This model is essentially an ecological hypothesis (or, more correctly, a set of hypotheses), including of the importance of things left out, such as competition. It is these that should be tested. The set of metrics analysed, and the generally positive light this puts on the model, is discussed as if the reason for the model's encouraging performance is its treatment of biological diversity. However, there is nothing in this paper that substantiates this claim. A series of model simulations with, for example, varying levels of allowable diversity, would enable an idea such as this to be tested.

A few details:

p. 4652.21 2373 gC m⁻²? p. 4681. C2? p. 4687.3 JP. Grime? Fig 5. odd scale on (c) Fig 6. scale too wide to show differences clearly Fig 11. legend has error for (b) Fig 17. 'percent' > 'fraction' ?

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