

***Interactive comment on “ Mortality as a key driver
of the spatial distribution of aboveground biomass
in Amazonian forests: results from a Dynamic
Vegetation Model” by N. Delbart et al.***

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I think this is a nice piece of work and highlights a major issue presumably common to many Amazonian DVM simulations; that assumptions of constant mortality across the Amazon basin are erroneous and will lead to errors in biomass, all other things being equal.

I think this paper is acceptable in its present form and would be maybe slightly improved with the minor corrections below. In addition, one aspect that I

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think is missing from the discussion is an exploration of the physiological or ecological mechanisms responsible for generating the observed NPP/mortality relationship. The interactions between climate, soil type and depth and ecosystem properties have been discussed in recent RAINFOR project publications (e.g. <http://biogeosciences-discuss.net/6/3993/2009/bgd-6-3993-2009.pdf> and <http://www.biogeosciences-discuss.net/6/3707/2009/bgd-6-3707-2009.pdf>). While it might be slightly beyond our comprehension at this stage, it is worthwhile noting that we may, in the medium-term, want to simulate the linkages between climate, soil, mortality risk and competition such that the NPP-mortality relationships (and how they change with climate and CO₂) can be predicted and these data used for validation, rather than parameterisation.

Specific Comments. 3:27. Change ‘One General Circulation Models’ to ‘One General Circulation Model’ 4:1 ‘in line’, not ‘on line’. 4:6 ‘Most DVMs employ the concept of an average plant’. Some newer DGVMs (SIEB, LPJ-GUESS, ED) do not employ average plants, but have multiple average plants for each PFT. Equations 1-4 all need units. 10:2 insert ‘of’ after ‘testing’ 10:13 Clarify here, just to make the reading smoother and to stress this point, that ‘total’ NPP is above + below ground NPP. 14: 2 Does Orchidee not have a stress-related mortality? Most DVMs use the sum of background and stress mortality rates. This needs clarifying slightly. Some reference to the work of Chao and Philips might be worthwhile in this paragraph. 14:30 This is very mysterious. Why can’t light limitation be greater than water limitation? How can you simulate semi-arid/cold/nutrient limited systems like that? 15:1 To simulate the variations in AGWB in the Amazon, we must first understand what is driving them. This is commonly understood to be some combination of soil fertility and physical properties (Quesada). I can’t see how we are going to explain the variations in NPP and mortality unless we somehow account for this. 15:24 “ but the constraint on NPPAGW looks robust from our results”, needs a reference to whichever figure you are referring to. 20:3 I don’t think it would be appropriate to extrapolate this (NPP-mortality) relationship into other systems in the manner described (capping lifespan at a maximum value for low

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productivity ecosystems). All the data used for fitting the relationship come from Amazon rainforests, whose productivity, by definition, never gets very low. In semi arid ecosystems numerous other factors (water competition, fire, grazing) are important for biomass, and these are not represented by this dataset. Fig5. This should really be 2 figures.

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