

Interactive comment on “Nitrogen feedbacks increase future terrestrial ecosystem carbon uptake in an individual-based dynamic vegetation model” by D. Wårlind et al.

C.D. Jones

chris.d.jones@metoffice.gov.uk

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I really liked this paper, although I didn't feel qualified at the process level to review it formally. But I had a question that arose from the very interesting dynamics of N-limitation acting to reduce carbon uptake by present day, but enhancing it by 2100 under RCP8.5

presumably, therefore there is a level of climate change, or some state, where the two effects balance. So, under RCP2.6 for example the impact of N-cycle may be still to reduce carbon uptake - can you specify where/when this transition happens? In your results it happens globally when the curves in figure 1 cross - around 2030? but is this

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either rate or state dependent? and presumably it varies regionally too.

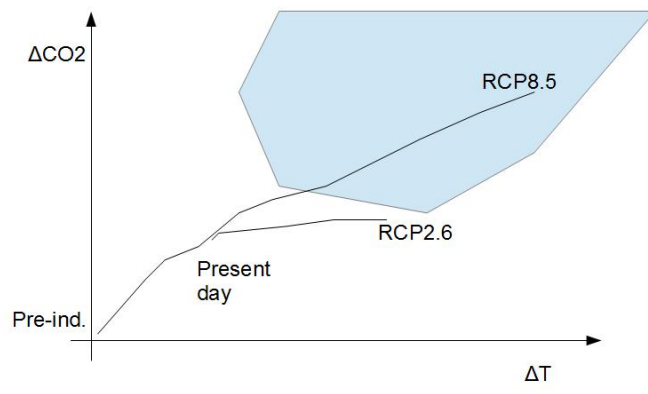
It occurred to me it would be nice to map out a phase space of delta-T and delta-CO₂ perhaps within which you can see how the balance of N varies - see attached very simple schematic. Could you produce this for different regions? or maybe a variant of this figure with delta-T vs latitude, so some regions show up as reduction-to-enhancement at different levels. This could be done for other models too where presumably they don't cross this threshold - but perhaps they would at higher levels that just aren't sampled in the studeis to date.

I haven't really thought this through in detail, but might be a nice way to present this potentially very important transition.

Chris Jones.

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White = region where N limitation causes net *decrease* in C uptake
Blue = region where N limitation causes net *increase* in C uptake

Fig. 1.