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Geoscientific Model Development Discussions

Interactive comment on "Upscaling with the dynamic two-layer classification concept (D2C): TreeMig-2L, an efficient implementation of the forest-landscape model TreeMig" *by* J. E. M. S. Nabel

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General Comments

The author invented the dynamic two-layer classification concept (D2C) for approximating simulations of Dynamic Vegetation Models (DVMs) those contain spatially-linked-processes such as seed dispersal. The underlying idea is to extract processes that do not require spatial information to a reduced-size non-spatial layer, which is dynami-

cally linked to the original two-dimension layer, which only takes care of spatial related computations.

The author adapted the D2C concept to TreeMig-2L, a forest-landscape simulation model, and examined its performances on each combination of two contrasting topographical conditions (i.e.; plain field and mountainous area), three organizations of bioclimatic type (i.e.; different resolution of classification), and three different model versions. On any of these combinations, simulations with D2C concept led to considerable reductions in CPU time, while reduction of accuracy can be controlled within the magnitude of deviations due to inter-annual variability of climatic conditions if these combinations was selected appropriately.

This kind of approximation method is required to treat large geographical scale with DVMs, because simulating large area with a coarser spatial resolution risks accuracy of simulation, especially when migration concerns. The Author discusses applicability of the D2C concept for other DVMs, and states it is applicable for most DVMs with few and simple spatially linked processes, such as TreeMig, EM, and LPJ-Guess. Therefore, the D2C concept would have general importance for DVM studies.

The topic should be within the scope of the GMD, and I believe journal's readers will have interest on this manuscript. Explanations for the model structure would be enough, simulation protocols are well organized, and results are appropriately presented and discussed.

Specific Comments

(1) P5537 L23

I cannot understand what "thematical" means here

(2) P5537 Para2

Following work should be adequately addressed here, as it is a pioneer work that adapted an approximation method on a forest dynamic model. Moorcroft, P. R., et al. (2001). A method for scaling vegetation dynamics: The ecosystem demography model (ED). Ecological Monographs 71(4): 557-586.

(3) P5542 L7∼11 and L25∼28

I cannot understand these sentences, where author try to explain how D2C organizes grid cells of the TreeMig-2L.

(4) P5547 Para2

The model versions 2 and 3 would be explained more. It is very difficult to understand what they are at first reading.

(5) P5548, L15∼17

The term "peak element-cell ratio" is not defined anywhere in the manuscript. Also, please proved brief explanation for the "callgrind".

(6) P5564, caption of the table 3

Need more words. According to GMD's "manuscript preparation guidelines for authors", tables should be self-explanatory and include a concise, yet sufficiently descriptive caption.

Interactive comment on Geosci. Model Dev. Discuss., 8, 5535, 2015.