Geoscientific
Model Development
Discussions

Interactive comment on "Use an idealized protocol to assess the nesting procedure in regional climate modelling" *by* Shan Li et al.

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The Newtonian relaxation is applied outside the RCM's domain. There is no relaxation at all inside. So our practice corresponds to Davies (1976), but not Von Storch (2000). The confusion was certainly in the reference to Drobinski et al. (2015) who performed relaxation inside RCM. In our original text, we only wanted to mention that our relaxation was applied to the four meteorological variables T, u, v and q, as in Drobinski (2015). To avoid confusion, we will simply delete this reference, and clarify the experimental design.

The temporal resolution of lateral boundary conditions from GCM is every two hours. The buffer zone is indeed the whole globe outside the RCM's domain. In

our "master/slave" configuration, RCM also covers the whole globe. In terms of relaxation strength, we used a binary solution for the relaxation time: 1.5 hour outside the domain and infinity inside (1.0e+25). We didn't employ any transition between the two. In fact, our configuration inherited from a two-way nesting methodology in which we need the two models to be spatially complementary from each other. We now provide our model code and configuration files in the Annex (http://www.lmd.jussieu.fr/~li/LMDZ4_compilation.docx) (please don't copy/paste, but type the link in the browser). All interested readers may totally reproduce our configuration. We will add all these descriptions in the revised manuscript.

We agree with the reasoning of the Referee for the updating frequency of GCM and the relaxation time, although we did not observe any obvious distortions. We recall that our GCM updating frequency is here every two hours, and the relaxation time scale is 1.5 hour for RCM boundaries. The relaxation time is an indication of the e-folding time scale. Relaxed variables can never reach the driving variables. This issue is naturally included in our configuration and in many other RCM practices. It constitutes somehow our investigation objective. This manuscript is a first step to investigate the commonly-used methodology of driving RCM through lateral boundary conditions. Impact of GCM updating frequency and that of the relaxation time scale are planned to be reported in future.